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Proceedings of a workshop held at Shiraz, Iran, 6-13 March 1976

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VILLAGE HEALTH WORKERS

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Contents

Foreword

It is now widely accepted that health care delivery in developing countries and particularly in rural areas cannot be effectively carried out exclusively through the deployment of Western-style medical doctors. The reasons for this are well known. Among them is the fact that doctors are not only costly to train but, being urban-trained, they are urban-oriented and tend to concentrate in towns where they find both the possibility to practice the kind of medicine they have learned, and to lead the kind of life they are accustomed to.

However, many questions regarding the most appropriate ways of delivering health care to rural areas remain unanswered: these include the kind of health care that can or should be delivered, the personnel to deliver it, the training this personnel requires, the eventual supervision and referral system, the need to integrate health into a comprehensive development program, the relation that exists with traditional healers and the evaluation of results achieved by various programs.

The purpose of the IDRC-sponsored seminar on village health workers was to give an opportunity to participants from seven countries, as different and remote as Nepal and Papua New Guinea, and Indonesia and Afghanistan, to compare their experience, their problems, and the approaches taken to solve them.

The seminar was not a self-congratulatory recitation of achievements but an open forum where problems, obstacles, and failures were described and discussed. Achievements are important, because they can sometimes be adapted and transferred, and they are, therefore, also presented in this report.

For example, the evaluation study carried out by the community medicine department of Pahlavi University in Shiraz on the impact of a health workers project in remote villages is perhaps unique, and is described in some detail, as is the survey carried out in Nepal of the health needs expressed by a community.

It was impractical, however, to publish the entirety of the reports presented at the meeting, as some of them have many similarities. A few reports have therefore been abstracted.

Extemporaneous discussions between the 20 or so participants revealed a number of significant emphases and observations relevant to several countries, and these discussions are summarized at the end of this report.

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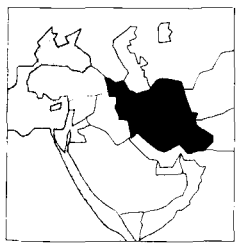

IRAN

Village Health Workers in Iran

Population:	36 million*
Infant mortality rate:	139 per 1000/yr
Crude birthrate:	45 per 1000/yr
Crude death rate:	17 per 1000/yr
Rate of population growth:	3.1% per yr
Per capita GNP:	$490

**All figures from 1976 World Population Data Sheet of the Population Reference Bureau, Washington, D.C.*

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Iran, a fast-developing country with a population of 33 million, suffers from a shortage of trained health personnel. About half of its 12 000 physicians practice in Tehran, Iran's largest urban centre, with most of the rest residing in other cities. This leaves approximately 60% of Iran's population, those who live in the 65 000 villages and rural areas, with little or no medical services and with a physician to population ratio of 1:15 000.

To help alleviate this great shortage, Iran is now importing foreign physicians to provide medical service to the rural areas. This has helped to some extent but the problem still exists. Furthermore, there are very few paramedical personnel: only about 5400 nurses and midwives and 9000 nurse/midwife assistants currently practice in Iran.

Given this health manpower situation, it is obvious that the existing numbers of physicians and paramedics are inadequate for rural health care delivery in Iran. In an attempt to provide a partial solution to this problem and to create a model for village health care, the Department of Community Medicine at Pahlavi University Medical School in Shiraz undertook two pilot projects. One was the training of "village health workers" (VHWs). VHWs are literate village men or women who receive 6 months training in both preventive and curative health care, and upon completion of their training are sent to a village to provide basic health care, under the regular supervision of a physician. The second project involves the training of "middle level health workers" (behdars), men or women with a minimum of 9 years of education who are trained for 4 years. Following their training they live in small towns and large villages, supervise the work of the VHWs, help train future VHWs, and handle patients referred from the villages by the VHWs.

The Kavar Village Project

In January 1973, to find out whether or not barely literate villagers could effectively improve rural health in Iran, the Department of Community Medicine undertook a pilot study with IDRC's financial support. A study site was chosen at Kavar, a small town about 35 miles southeast of Shiraz, to begin the training of VHWs. Located in Kavar was a health corps station, one of about 400 similar health centres found throughout rural Iran. (Health Corps is the organization created to establish universal medical care, which is one of the principles of the revolution initiated by H.M. Shahanshah Aryamehr in 1964.)

These stations are staffed by recent medical graduates who spend 18 months at the station in lieu of military service. Health corps stations seemed to be the ideal site for VHW training.

It was realized that the VHWs would have to be continuously supervised once their

training was completed and they were sent to the villages. The health corps physician was a logical choice for clinical supervisor, and the health corps station was also a logical choice, both as a training site and as a centre for continuing education of the VHWs. Furthermore, the health corps stations provide 400 nuclei in rural areas throughout Iran around which future VHWs could be placed, thereby greatly expanding the number of villages where health care would be available.

Other determining factors in selecting Kavar as the study site were a lack of any other available health care in the area, reasonable proximity to the city of Shiraz, and the administrative and supervisory resources available.

Prior to the selection and training of the VHWs, baseline surveys were conducted to determine disease prevalence and the availability of literate villagers and medical care. Epidemiological studies in Fars province provided data on disease incidence among rural village populations as well as indications of the feasibility of providing primary health care through the use of auxiliaries with very basic training. It was shown that most of the complaints at the village mobile clinic were fairly simple and that an auxiliary health worker was capable of adequately treating most of the cases and referring the remaining 10% to the medical centre.

In addition, a random-sample knowledge, attitudes, and practices (KAP) study of 200 households about individual and public village health was conducted. Census data on births, deaths, marriages, divorces, immigrants, emigrants, and total population, were also gathered.

Based on the data obtained from the studies, the behavioural objectives to be met by the VHWs were developed. Objectives were specified in six areas: communicable disease control; environmental health; nutrition; community education; maternal and child health and family planning; and treatment. These behavioural objectives then provided the basis for curriculum planning and the content of the Persian learning material to be prepared for the course. The subjects covered included growth and development, anatomy and physiology, nutrition, communicable diseases, VHW-patient relationship, maternal and child health and family planning, and rural public health.

Dr Ronaghy and colleagues at Pahlavi University, Shiraz

Selection of the VHW Trainees

The philosophy of the project from the beginning was to involve the villagers as much as possible in decisions and overall participation. Therefore, a total of 33 villages surrounding Kavar were visited and the village "head man" (Kadkhodah) or head of the village council of each village was consulted about the presence in his village of a literate man or woman who might be a suitable VHW candidate. The villages were then revisited, and all candidates were given literacy tests.

A group of 27 top candidates was then selected and all were tested for physical and mental fitness; they were personally interviewed to determine their attitudes toward the project goals, family planning, traditional medicine as compared with modern medicine, and their reasons for wishing to join the project. Finally, 16 VHWs from 16 villages were chosen. They represented a wide range of ages, personalities, and socioeconomic backgrounds. There were 11 men and 5 women, and they ranged in age from 16 to 45 years.

As a result of the evaluation of early experiences, trainees are now selected on a merit basis rather than by village authorities, and will not necessarily be located in their home villages when they complete training. This change was designed to remove the VHWs from the influence of village authorities and to lessen the like-

lihood of their involvement in local political and family disputes that might hamper their ability to function as VHWs.

Training Method

Once assembled in Kavar, the VHWs began, in August 1973, an intensive 6-month training course. The major objective of the course was to prepare the VHWs for preventive and educational work in their respective villages. Of particular importance were sanitation and basic hygiene, nutrition, family planning, immunization, environmental health, and communicable disease control. These subjects were taught by staff members from the Department of Community Medicine, medical personnel from the Health Corps, and the project training director. In each case, theory and practice were integrated, so that every day the students had an opportunity to apply in the field or in the clinic what they learned in the classroom.

The students were extremely enthusiastic and learned at a much faster rate than had been anticipated. They all lived together in a rented house in Kavar, where meals were provided and where *esprit de corps* developed among them. The trainees received 500 Rials (U.S. $7.50) per month as expense money. They also helped the school by performing various tasks.

Classes were taught in the rented house, while practical and clinical work was done at the nearby health corps station. The students were divided into four groups of four students each. One group worked with the midwife attached to the health corps family planning clinic, who taught maternal and child health and family planning. Another group worked with the health corps aide in the treatment room, where he demonstrated sterile technique, methods of giving injections, burn treatment, wound dressing, and other first-aid skills. All of these were practiced by the students until they became proficient.

A third group worked with the health corps station assistant, whose training was in pharmacology, who taught them indications, contraindications, dosages, and side effects of drugs. The fourth group remained with the health corps physician, who explained history-taking, physical examination, and patient evaluation.

Although diagnosing and treating patients was not a major objective of the program, patient screening in the village (treating only minor problems and referring the rest to a physician) was seen as quite important. The students rotated from group to group on a weekly basis. In this way all the students had experience in each of the four areas.

The final 3 months of training were devoted to clinical skills. Although prevention and education were considered more important, it was unlikely either would be effective without all of the VHWs seeing and treating sick patients. Villagers are primarily interested in being taken care of when they are sick; they are not likely to respect someone who talks to them but provides no relief for their ailment, however minor. Given this fact, the main rural clinical problems were identified and the VHWs were taught ways to assess them and to know whether a patient should be treated in the village or referred to a physician in Kavar or Shiraz.

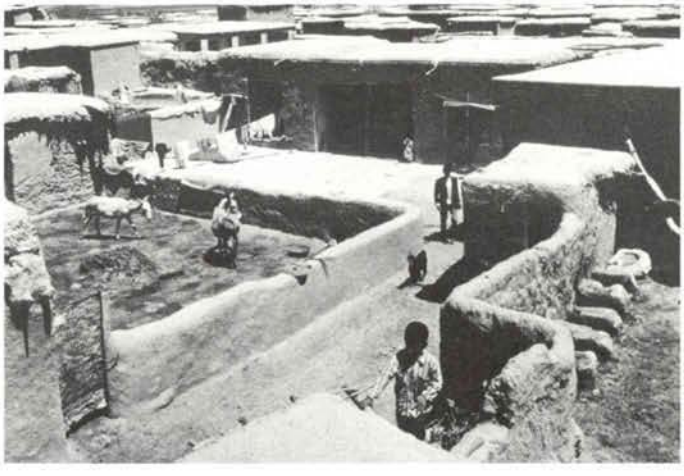
In addition to seeing and treating patients at the health corps station (under the close supervision of the health corps physician), the VHWs made numerous field visits to nearby villages. The purpose of these visits was primarily to learn practical methods of improving village hygiene and sanitation. They sampled water supplies, carried out sanitation inspections, and visited the schools and other village centres for inspection and education.

Trainees' skills and knowledge were evaluated periodically throughout their 6 months through written examinations and observation. A committee of physicians observed VHW trainees in clinical and field settings and evaluated their competence in history-taking and physical examination, recognition of symptoms, planning for treatment, administration of first aid, education of patients, VHW–patient relationship, education of villagers, data collection, and inoculation technique.

Field Work

Throughout the 6-month training phase, periodic visits to the villages and meetings in Kavar were used to familiarize the villagers with the aims of the project and to establish

A health worker examining a child in one of the villages of the Kavar project



Many small villages in Iran are isolated, sometimes inaccessible during the winter

The University Hospital in Shiraz, where patients can be referred by health corps physicians

working arrangements for the VHWs. All project villages found clinic space and provided miscellaneous equipment according to what the villagers could afford. Project funds provided basic medical supplies and other necessary items that the villagers were unable to supply.

The first class of 16 VHWs (supported by funds from IDRC) completed their training in March 1974 and were sent to villages surrounding Kavar. A second group of 30 students (supported by funds from the government of Iran) began training in the fall of 1974, and assumed their responsibilities as full-fledged VHWs in September 1975.

Depending on the size of the village, VHWs spend between 1 and 6 hours a day in the clinic, when patients are seen and treated (or are referred to the health corps station physician; eventually referrals will be made to the middle level workers), and are instructed in preventive measures to avoid a recurrence of their illness. Following their treatment activities, VHWs make home and village visits for follow-up care, to discuss family planning, sanitation, and nutrition with villagers, and to supervise sanitation projects.

In addition, the VHWs, as part of their ongoing responsibilities, keep detailed records on the number of patient visits, and the age, sex, diagnoses, and treatment of patients. Information is also recorded on their sanitation, health education, family planning, and other preventive activities, and on births and deaths in their villages. A physician visits each VHW once a week for supervision and evaluation of clinical performance, while the VHWs' nonclinical activities are supervised by the training director. The evaluation reports serve as a basis for the topics covered at the monthly continuing education meetings of the VHWs in Kavar. The VHWs also return to the training centre for a 2-week refresher course each summer.

Conclusion

Evaluation studies indicate that the VHWs are well accepted by the people and that they are influencing the health practices of the villagers. During the VHWs' first 6 months in the field, patient visits to clinic facilities numbered 4875 of a population of 9152. The percentage of females between the ages of 15 and 44 who were using family planning methods increased from 8.8 to 21.4.

In addition, the VHWs have been able to motivate the villagers to make much needed sanitation improvements, including construction of sanitary toilets and improvement of existing ones; separation of animal quarters from human living quarters; development of clean water sources (pumps and wells) and having drinking water boiled when it cannot be obtained from a clean water source; and improvement of existing bathhouses or construction of new ones where needed. Health education programs conducted by the VHWs have focused on improvements in personal hygiene, such as more frequent and regular bathing, as well as the introduction of handwashing with soap after using the toilet.

Overall, indications are that the VHWs are highly productive and well accepted in the villages they serve and that the extension of the VHW concept is not only feasible but would provide a strong foundation for Iran's developing health care delivery system. A four-tiered system is envisioned, with physicians living in cities seeing those patients referred by the health corps physician, who will in turn see those patients referred by the behdars. The health corps physician will also supervise the behdars' activities, while the behdars will supervise and see patients referred by the VHW. Physicians would therefore comprise the upper two levels, and the two auxiliary groups the lower two levels of the regionalized system of health care, which does not at present exist but that will hopefully be created in the future.

VHWs are productive and well accepted

Middle Level Health Workers Training Project in Iran

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Since September 1973, the Department of Community Medicine of Pahlavi School of Medicine, in cooperation with the Plan Organization, has been conducting two projects to train rural auxiliary health workers: the Village Health Worker Project in Kavar and the Middle Level Health Worker Project in Marvdasht.

The same geographic and manpower situations shaped the two projects: numerous small and isolated villages and few trained medical personnel. The VHW (village health worker) is a literate villager who receives 6 months training in preventive and curative medicine and is assigned to a small village. The middle level health worker (behdar) has from 9 to 11 years of education and is trained for 4 years. A three-tiered system is therefore envisaged, with the behdar serving as the link between the VHW and the physician or hospital.

Role of the Behdar

The middle level health worker training school was planned and initiated by the Department of Community Medicine. In the summer of 1973, a house was rented in Marvdasht, a small town 45 kilometres from Shiraz. It was equipped to house 30 students and to provide classroom space. Staff were employed, and the school was ready to open in October 1973.

The middle level health worker (MLHW) will perform three major roles: practitioner, teacher, and supervisor. The behdar will function as a practitioner by seeing those patients referred to him or her by the VHW. Any patient with medical problems beyond the VHW's level of competence is referred by the VHW to the behdar. The behdar will also see patients from his or her own town, and will teach aspects of basic disease prevention and health education, both in his or her own small town and in the villages. He or she will also play a vital role as teacher to the VHWs. The behdar will live primarily in small towns and large villages and will be responsible for supervising the VHWs located in villages surrounding the town.

Selection and Recruitment

The Marvdasht MLHW Project is an attempt to create a health worker who is competent enough to deal with most medical problems encountered in the small towns and villages, and yet one who will be satisfied to live in a rural environment. It was decided that all candidates must have a minimum of 9th grade education, but not be graduated from high school. In this way, bright students who do not have the immediate option of medical school can be selected.

In the fall of 1973, 30 prospective students were selected. Twenty of the students were interviewed and chosen from the Tribal Teacher Training School in Shiraz, and another 10 came from nearby villages and were selected by interview and entrance examination results. In the following 2 years, students were recruited only through radio and newspaper announcements and by word of mouth from the students themselves. In the second year of the program's operation, 48 students were selected and in the third year, 41.

Lack of appropriate dormitory space prohibited the inclusion of women in the 1st year. With the availability of additional housing during the 2nd and 3rd years of the program's operation, women were recruited for the program, and there are now 13 women enrolled in the program out of a total of 118 students.

Curriculum

The behdar project curriculum seeks to combine theory with practice. The minimum number of credit hours in theoretical studies is set by requirements of the Ministry of Higher Education for programs leading to the technical diploma in auxiliary health. Accordingly, students receive a total of 4768 hours of instruction over 4 years, of which 1264 hours are spent in theoretical instruction and 3504 hours in clinical experience. The curriculum is arranged in such a way that hours in the classroom decrease with each year of training. Clinical experience assumes a proportionately greater role in the trainees' program until the

second semester of the 3rd year and the entire 4th year, which are spent entirely in supervised field work.

The students apply their classroom learning in four clinical settings. In the Red Lion and Sun Clinic outside Marvdasht they see patients under the supervision of the clinical physicians, performing physical examinations, giving injections, learning first-aid care of emergency cases, and dispensing drugs prescribed by the physicians.

In the "behdari," the Ministry of Health clinic in Marvdasht, the students work in the departments of maternal and child health (female students only) and family planning, giving injections and vaccinations, and doing bandaging under the supervision of behdari physicians and laboratory technicians. In the clinic's laboratory they learn to perform those tests that they can use in their clinics, which will not be elaborately equipped or may not even have electricity. These tests include complete blood counts, litmus paper examination of urine, examination of faeces with mirror microscopes, and preparation of blood smears. The students also become familiar with more complex tests.

In a new clinic facility established by the Department of Community Medicine in Marvdasht, 2nd and 3rd year students observe and assist a dentist while he treats patients. They learn to perform preventive dental hygiene care, to lance simple abscesses, to administer local anaesthesia, and to perform simple tooth extractions.

In each of the three clinics described above, 2nd year students observe and perform the most simple tasks, such as bandaging sores and giving injections; 3rd year students perform more complex tasks and supervise the 2nd year students.

The fourth clinical training ground is the department's mobile clinic. Under the supervision of a departmental resident, the mobile clinic mini-bus visits four villages in the Marvdasht area. The students work in teams of one 3rd year student and two or three 2nd year students per patient. The 2nd year students take a preliminary history, the 3rd year student asks additional questions, diagnoses the patient's complaint, and prescribes proper medication. The team then presents its findings to the supervising physician, who gives them immediate comments, corrections, and training.

Middle level health workers form the link between the VHW and the physician or hospital

In addition to their regular classroom and clinical work, during the first 2½ years of training, the students make periodic field trips to nearby villages. In cooperation with the villagers, they determine the villages' needs, and work to improve sanitary conditions.

After completing the first semester of the 3rd year, the students begin to supervise three to four VHWs and to work in their own clinics under extremely close supervision. In the 4th year, they continue this work, though under less supervision. Continuing education courses are organized as needed.

Evaluation and Certification

Trainees' learning is assessed monthly and at the end of each semester in each current subject area of study. Their clinical performance is evaluated in each clinical experience by the supervising physician. Furthermore, at the end of each semester, the departmental residents conduct a formal evaluation by simultaneous independent rating of observed clinical performance. Evaluations of students' learning and performance, together with staff assessments of the program, are used as the basis for revisions in curriculum and teaching methodology.

Plans for the Future

An intensive course in education is being planned by the department and the Regional Teacher Training Center. Participants will be selected from promising behdar graduates. They will be trained in educational theory, techniques, and resources to prepare them to teach VHWs.

A complex of dormitory, clinic, and classroom facilities is currently under construction in Kavar, where the VHW school is located. It is anticipated that, upon completion of these facilities in 1976, the VHW and behdar training projects will both be located at this site. The facility can accommodate up to 500 students and their teachers.

The Marvdasht Project and several nearby villages have contributed funds for the construction of a small clinic in Koshk, a village approximately 10 kilometres from Marvdasht. After completion, the clinic will be staffed by behdar students and will provide medical treatment for residents of Koshk and nearby villages.

The department of community medicine research unit carries on a range of research projects, of which two are particularly relevant to the ongoing planning of the Marvdasht auxiliary health worker school. The first is a continuing analysis of data provided by the mobile clinic concerning medical needs, epidemiology, and drug utilization. The second is a study of morbidity and mortality, fertility, and other demographic and manpower characteristics of the population that will serve as baseline data for evaluating the impact of introducing the behdars and VHWs.

Classroom in Marvdasht

Sanitation work: inspecting a well

Evaluation of Iranian Village Health Workers Efficacy

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Useful and methodologically sound evaluation of the VHW's work is of fundamental importance in the Iranian project and has been carried out by the research unit of the Department of Community Medicine. It is never possible to carry out all the evaluation that would be useful in a project of this magnitude. Monetary, personnel, and time limitations restrict studies to those most feasible and necessary. In addition, although one usually cannot design evaluation that is ideal in every respect, it is useful to have some model according to which such evaluation is incorporated into the project.

The first step in planning any auxiliary program must certainly be to choose the broad objectives of the auxiliary's work. Auxiliary projects differ widely in their objectives, some having a very specific, narrow range of objectives, others, a broader one. After the objectives have been set, the next step is to choose the personnel and methods by which these objectives are to be achieved. At this point, evaluation of the methods and results should be arranged. Planning for evaluation should include several considerations:

- For the objectives of the program, evaluation measurements should be chosen that are as directly related to the objectives as possible. For example, if the objective of the program is to reduce infant mortality, then the evaluation should obtain accurate measurements of infant mortality.

- If in the course of the planning of the program, significant questions arise concerning the methods, personnel, location, training, and so on, then it is also in the planning stage that studies should be designed to provide answers to these questions. For example, if there are questions concerning the association of certain characteristics of the auxiliary with his acceptance, or with some other criterion of success, then studies should be designed to investigate these relationships.

- Certainly one should always avoid the temptation simply to accumulate facts. When facts have no discernible application to some specific hypothesis, then the time and effort spent in accumulating them is, for the most part, wasted from the point of view of evaluation. This is the major reason why evaluation should be designed in the planning stages of the program.

When one makes choices about what will be evaluated and how it will be done, several factors should be considered: (*a*) what studies are most needed; (*b*) what measurements can be most accurately obtained; (*c*) limitations of cost; and (*d*) for which studies adequate control or comparison can be obtained.

This last consideration leads us to the next step — frequently the most difficult aspect of carrying out successful evaluation studies — that of choosing an adequate basis for comparison. There are essentially two types of comparison one can make: first, one can use the study population as its own control, taking the situation that existed before the auxiliary arrived as the control measure. Thus, one might look at the infant mortality rate before the arrival of the auxiliary to assess the auxiliary's effect.

The primary methodological difficulty encountered in such a study is that one is measuring changes over time, hence questions may arise as to how much of the change can be attributed to the auxiliary and how much should be attributed to factors that have changed during that time period. The greater the time elapsed between initial and final measurements, the greater the possibility of variation through changes in other factors.

The second method of comparison is to select a control population that has no auxiliary, but in all other respects is as similar as possible to the study population. The key to the methodological difficulties in this control technique is contained in the phrase "as similar as possible." There may be instances in which it is not possible to choose a control population for which similarities with the study population are adequate. In addition, there may be underlying differences between the study and control populations that are not easily detected. In this type of study, the investigator must establish the likeness of the two populations, rather than merely assume it.

After studies have been designed, measurements are taken periodically. The results can then be applied (i.e., to demonstrate applicability and effectiveness, whether positive or negative) or used in changing the original decisions concerning objectives, personnel, and methods. The results of evaluation of one auxiliary program may be useful to others who are designing or conducting auxiliary programs in other areas.

Three Studies Completed

Three evaluation studies have been completed in the Kavar auxiliary project and two more are in the data collection stage. In all our studies for which comparisons were needed, a control population was used. All control villages are in the Kavar area, closely situated to the study villages, and are, as far as is possible to determine, extremely similar to the project villages, socially, economically, and demographically.

The first completed study, called the Acceptance Survey, was conducted 6 months after the arrival of the VHW. Its purpose was to obtain some objective measure of the level of acceptance of the auxiliary and to determine whether certain of the auxiliary's characteristics were related to his acceptance by the villagers.

The second study was the family planning survey. A major objective of the auxiliary program is to increase family planning and the use of oral contraceptives in the villages. This includes increasing the level of knowledge about contraception and altering attitudes about family planning.

The third study, and the most ambitious of the three, was the measurement of vital rates, to determine the auxiliary's impact on mortality and on birthrates.

Two studies in our evaluation program remain to be completed. The first is an evaluation of the ability to diagnose and treat patients (auxiliary's) by comparing his diagnosis, prescribed treatment, and decision on referral or nonreferral, with those of a physician on the same patient. The cooperating physician sees the patient and records his diagnosis and prescription without knowledge of the auxiliary's conclusions. Comparisons of the diagnosis will be made by an independent observer, who will not know which diagnosis has been made by whom.

The final study planned is the assessment of the auxiliary as a health educator, by comparing levels of knowledge about health, disease, and disease prevention in auxiliary versus control villages.

The acceptance survey was conducted on a sample of the adults in project villages. The group was chosen by taking a systematic sample of one-tenth of the residences in each village after a random start. Each adult in a household (except for a few persons who were never located) was interviewed individually by different members of the research team.

The response to the presence of the VHW was generally highly favourable; 220 of the 226 villagers interviewed responded that they were happy with the VHW's work.

The most negative response was given to the question: "Do you think the VHW knows enough?", to which 19% of the sample said they did not feel the VHW knew enough.

An enquiry was made to see if any known characteristics of the VHW were associated with the belief that the VHW "did not know enough." The villagers response indicated no difference between male VHWs and female VHWs, or between VHWs in their own villages and from other villages. There was no relationship between the social class of the VHW and the villagers' perceptions of his knowledge.

"Do you think the VHW knows enough?"

There was, however a relationship between the age of the VHW and the percentage of villagers who did not feel that the VHW knew enough. The villages with a young health worker contained, on the average, a considerably higher proportion of persons who felt that the VHW lacked adequate knowledge than did the villages with an older VHW. The correlation coefficient for the linear relationship between the age of the VHW and percentage of negative responses in the sample group was $r = -.60$.

Thus, the villager tends to have more confidence in the older health worker's knowledge than in the younger's, even after some direct experience. The common belief in the villages that wisdom increases with age, particularly in matters concerning health, probably accounts for the relationship observed here. Since other measures of attitude did not vary by age, and since studies did not reveal any reluctance of persons to visit younger VHWs, it appears that this particular prejudice has not hampered the VHWs' work. However, the fact remains that the young VHW probably must overcome more skepticism concerning his abilities.

The mean attitude score in each village was computed and the values analyzed according to various characteristics of the VHW. The possible range for any person's score was −4 to +4. Those villages with a male VHW had a somewhat higher mean attitude score than those with a female VHW: +3.45 for males, compared to +2.99 for females. This difference was not significant ($t = 1.26$, $p > .10$). There was no difference between the attitude scores of those who had a VHW from their own village, and those who did not.

Table 1 shows the responses by villagers to each of the questions about the VHW. Each of the respondents was asked to give the most correct answer among those listed under question 6. Seventy-five percent said that the VHW knew more about medicine than most of the people in the village. Those who gave an incorrect answer were far more likely to overrate the VHW's knowledge than to underrate it: 47 people responded that the VHW knew as much as a doctor. The mean knowledge score in the villages did not vary according to the age or sex of the VHW or whether the VHW was a native of the village or not, and showed no correlation with the attitude scores.

Each villager was asked whether he preferred the VHW to be male or female. The responses were analyzed by sex of the respondent and by sex of the VHW. Results showed that males generally preferred males and females preferred females. However, more detailed analysis showed that among

Table 1. Responses by villagers to questions about the VHW.

	Correct	Incorrect
1. Name of VHW	206	19
2. Where VHW is from	208	16
3. Length of VHW's training	100	110
4. Trained by whom	49	157
5. Measures taken to improve sanitation in the village:		
Talked about cleanliness	203	23
Talked about separating animals from houses	183	43
Talked about clean water	188	38
Cleaned his own house	171	55
Helped the villagers to clean their houses	198	28
6. In your opinion about medicine, the VHW knows:		

as much as you know	more than most of the people in the village	as much as a doctor
9	165	47

Figure 1. *Proportion of users of oral contraceptives in VHW and control villages, by age.*

those males who have a male VHW, 71% prefer a male; another 24% say that it makes no difference. Among those males who have a female VHW, on the other hand, only 8% said they preferred a male. The remaining 92% say they prefer a female or that the sex of the VHW makes no difference. Thus, the attitudes of males toward female health workers were heavily influenced by direct experience with a female VHW. Among female respondents, preference was also influenced by experience. Among those women who had a female VHW, 64% said they preferred a female VHW. However, among those with a male VHW, only 35% definitely preferred a female. Thus, females were also influenced by experience, but less so than the males.

Persons participating in the survey were asked the question: "Do you prefer the VHW to be from your own village or another village?" Eighty-one percent said they wished the VHW to be from their own village. However, the results already presented show that there is little difference in actual attitude toward the VHW who works in his home village and one who does not. The second group of VHWs has been more widely recruited, in an effort to obtain the best qualified personnel, without attempting to recruit people from the same villages to which they will be sent.

Regarding the family planning survey, the proportion of current users of oral contraceptives among married women in VHW and in control villages, by age, is shown in Fig. 1. This was the proportion of women responding positively to the question "Are you now using any form of contraception?" among those included in a one-tenth systematic sample of residences. The VHW's function is solely to serve as a provider of oral contraceptives; he is supplied with no other type of contraceptive. The control villages are supplied by a rural midwife, who theoretically also supplies the IUD. However, in our survey we found very few women in either location using any form of contraception besides the pill, and it is an accepted fact that very few village women use the IUD.

Fig. 1 illustrates the vast differences in pill use between auxiliary and control villages. The greatest differentials occurred in the middle childbearing years. Again, to

provide some check on the accuracy of responses, we compared the proportion of current users in our sample with the proportion obtained by referring to the VHWs' records; the VHWs' records yielded an estimate of 26.4% compared to the survey estimate of 27.8%.

Estimates of length of usage were obtained from the auxiliaries' and midwives' records since it has been observed that most women, particularly those who have discontinued use, cannot estimate accurately the number of months for which the pill was used. The first-year termination rate was computed using the ratio:

$$\frac{\text{no. of terminations in the 1st year}}{\text{person-years of use in the 1st year}}.$$

The termination rate in the midwife villages was 30.2 per 100 woman-years of use, compared to 25.6 per 100 woman-years of use in the auxiliary villages. This result is important because it demonstrates that the increase in pill use in auxiliary villages has not been among women who simply took a packet of pills once because they were urged to by the VHW.

Table 2. Knowledge of contraceptive methods among married males and females.

	VHW			Control		
	Pill	IUD	Other[a]	Pill	IUD	Other[a]
Females						
15–24	93	20	14	61	20	18
25–34	90	28	12	68	25	29
35–44	88	25	13	69	12	14
45–99	88	13	19	56	21	10
Total	91	23	16	64	21	10
Males						
15–24	96	7	22	88	0	31
25–34	90	7	10	65	16	19
35–44	90	4	22	69	7	17
45–99	75	2	13	81	9	30
Total	86	8	16	75	12	24

[a]Coitus interruptus, rhythm, diaphragm, injection, or condom. Since the question was open-ended, the number of responses for coitus interruptus and rhythm was less than the number who knew of those methods. The few people who gave more than one of the answers are counted twice in the numerator of this column.

Table 2 shows the proportion of married males and females who know about the various methods of contraception. The question was open-ended, but each person was encouraged to give as many responses as he or she knew. The only category with substantial and consistent differences in response was the pill. Among married females, 91% knew of the existence of the pill compared to 64% in the control villages. The difference in knowledge among males was less, but still substantial.

Single persons in both auxiliary and control villages had essentially no knowledge of any contraceptive technique other than oral contraceptives. In the category of oral contraceptives, however, there were substantial differences in knowledge. Of single females in the VHW villages, 83% knew about the pill compared to 44% in the control villages. For single males the figures were 75% and 51%. Thus, the VHW has had an effect on knowledge of the pill in all adult groups, particularly among single females.

Table 3 gives the comparison of responses to the question: "How do you feel about using some method to prevent pregnancy?" Since the answers did not vary substantially by age, only percentages of the total are presented. With the exception of single females, the proportion in each group who said they completely agree with the use of contraception was higher in the VHW villages. However, the difference was not great in any group, and it seems clear that the VHW has not had as great an effect on attitudes toward contraception as he has had on usage and knowledge of the pill.

One matter of prime interest in the survey was to determine whether the sex of the VHW was related to contraceptive usage and continuation in the village. Rural villages of Iran remain a traditional male-dominated Moslem society, in which physical contact and discussion of sexually related matters between males and females is severely limited. Thus, there are legitimate doubts about the ability of a male VHW to serve as an educator and supplier of con-

Table 3. Attitudes toward use of contraceptives.

	Completely agree	Partially agree or neutral	Somewhat or completely disagree
Females			
Married			
VHW	76	17	7
Control	69	21	10
Single			
VHW	66	22	12
Control	70	23	7
Males			
Married			
VHW	70	18	12
Control	64	23	13
Single			
VHW	78	18	4
Control	73	25	7

traceptives for rural village women. The results, however, allay those doubts. The proportion using oral contraceptives was very similar in the villages with male VHWs to those with female VHWs. Twenty-nine percent of married women aged 15-44 in the villages having a female VHW were users, compared to 27% of those whose VHW was male. Continuation rates for the first year of use were also similar.

In order to test the validity of the comparison of the two groups and of the survey methods, a number of other questions concerning attitudes toward marriage, relationship of husband and wife, ideal number of children, etc., were also asked. It was felt that the VHW almost certainly would not affect attitudes or opinions in these social areas. Hence, consistent differences would signal either fundamental differences in the populations or the samples, or an undetected bias in the survey techniques. The results showed no consistent differences between the responses of the VHW villages and the control villages.

In summary, the results of the survey indicate that both the male and female auxiliaries have had a substantial and worthwhile impact in the area of family planning, and in education on contraception. The impact of the auxiliary on attitudes toward family planning, at least as measured by the survey, was not substantial.

Mortality and Birthrate

The last project, and probably the most fundamental of the three, was the comparison of mortality and birthrates in auxiliary and control villages. This census was conducted on the entire populations of both auxiliary and control villages, rather than on random groups as done in the first two studies. This, of course, was because the stable estimation of the event rates required the entire population base.

Vital rates showed rather large differences. The infant mortality rate (IMR) for the control villages was close to the figure of 120 live births quoted for Iran as a whole. The observed IMR in the auxiliary villages was almost half that of the control villages.

This does not imply necessarily that the IMR in auxiliary villages will always be half that of villages without auxiliaries, even if only random variation is taken into account. In Table 4 the values listed in parentheses are 95% confidence limits on the estimate of the IMR. The upper and lower 95% confidence limits for the IMR in auxiliary villages were 50 per 1000 live births, and 78 per 1000 live births, respectively. The setting of confidence limits is related *only* to random variation, and does not consider underreporting or the possibility of underlying differences between groups. As mentioned before, every effort was made to ensure the comparability of the auxiliary villages, and the measurements found for other demographic indices indicate that such comparability did indeed exist. However, it is never possible in human population studies to assure absolute comparability of experimental and control groups; hence, the possibility that part of the differences found in rates was due to systematic differences in populations cannot be totally eliminated.

The crude death rate also exhibited a considerable drop, 10.2 per 1000 in the auxiliary villages compared to 17.5 in

Table 4. Comparison of vital rates in VHW villages and control villages. (Values in parentheses are 95% confidence limits.)

Index	VHW villages	Control villages	Significant difference
Mortality and fertility			
Infant mortality rate	64/1000 live births (50–78)	124/1000 live births (97–150)	$p<.01$
Crude death rate	10.2/1000 population (8.0–12.4)	17.5/1000 population (15.2–19.8)	$p<.01$
Fetal death ratio[a]	36/1000 live births	79/1000 live births	$p<.01$
Total fertility rate[b]	6.41	6.96	Not significant
Crude birthrate	40.2/1000 population (35.8–44.6)	44.9/1000 population (41.3–48.5)	Not significant
Other demographic measures			
Median age, males	12.3	12.5	
Median age, females	12.2	12.7	
Literacy rate, males (%)	28	33	
Literacy rate, females (%)	6	7	
Dependency ratio[c]	1051	1021	

[a]In a census of this nature, it is not possible to distinguish true fetal deaths from deaths very soon after birth. Persons were asked specifically whether the infant was dead at the time of expulsion or extraction. The fetal death ratio is defined as fetal deaths divided by live births (× 1000).

[b]The total fertility rate is the hypothetical number of children born to a woman in her lifetime at the current age-specific birthrates.

[c]Number of persons < 15 and > 64 for every 1000 persons aged 15–64.

control villages. Since this could have been primarily due to changes in infant mortality, the death rate for those over 1 year of age was also calculated. The resulting death rate was eight per 1000 in VHW villages, compared to 13 per 1000 in controls, still a large reduction.

The fetal death ratio — number of infants born dead divided by the total of live births — provides some estimate of the ability of the VHW to prevent fetal deaths. The fetal death ratio in the auxiliary villages was about half that of the control villages. The VHW takes no part in actual births, but does refer to the health corps station difficult labor and all problem pregnancies, and cases in which delivery has not occurred 2 or 3 hours after the rupture of the membrane. It seems likely that the reduction in fetal deaths has come through the simple device of having someone in the village who knows when a doctor should be consulted.

The VHW also acts as a family planning educator and provides oral contraceptives to the women of his village. Thus, his presence carries the potential for a significant reduction in fertility. The census results indicate that the total fertility rate (expected number of live births in a woman's lifetime at the current age-specific birthrates) was somewhat lower in the VHW villages: 6.41 live births compared to the 6.96 for controls. The crude birthrate for auxiliary villages was 40.2 per 1000 persons compared to 44.9 per 1000 in the control villages. This difference was not, however, statistically significant, and it cannot be concluded from the amount of information now available that fertility is indeed lower in the auxiliary villages than in the control villages.

The rates from the present census do not represent the VHWs' potential for lowering birth and fertility rates. The census was conducted 15 months after the VHWs' introduction, and most births in the first 9 months after their arrival represent conceptions that occurred before they came. Hence, the VHWs had had only a 6-month period to affect birthrates at the time of the census, as opposed to the entire 15 months in which they could affect death rates.

Health or Development? Training of Frontline Health Workers, Particularly in Lorestan, Iran

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In the province of Fars about 3 years ago, an experimental project was conceived with the object of training rural health workers quickly and inexpensively to combat the primary health and medical problems in tribal areas. Villagers with little schooling were to be trained for a period of 12 months. If successful, the model would be applied throughout the country creating a network of health services.

To this end, 31 young men and women were recruited from among the local population primarily through entrance examinations followed by interviews with a team from the Imperial Organization for Social Services. The behvarzes, as these frontline health workers came to be called, are now serving as village health workers (VHW), in three clusters of villages near health centres staffed by physicians.

The behvarzes did not serve migratory tribal populations, since the travel required of physicians to supervise them was excessive. The cost of training was higher than expected and the impact of the behvarzes on the health of their respective populations has not been measured.

Nevertheless the experience proved one thing: health workers with modest schooling could, under the right circumstances, play an important role in bridging the gap between, on the one hand, the oversupply of doctors in well-equipped clinics and hospitals in rich urban areas, and on the other, the lack of any medical or health services in rural areas. This conclusion had been reached in other countries, but it was necessary to demonstrate its validity in the Iranian context.

Two other experiments in training village health workers in Iran had begun somewhat earlier, one by the Pahlavi University Department of Community Medicine, also in the province of Fars, and the other in West Azarbaijan, which was a collaborative effort involving the Tehran University School of Public Health, the Ministry of Health, and the World Health Organization. In this report no reference will be made to these two experiments except to say that they have also demonstrated the soundness of our basic approach to a graduated health care system.

Based on the model of behvarz training in Fars, a second experiment was begun within the Selseleh Regional Development Project in Lorestan, western Iran. Here, the training of frontline health workers was considered to be one aspect of a network of interrelated services in community development. Health services, while maintaining a loose affiliation with the project, were administratively, and in fact, autonomous.

The project was within the Prime Minister's responsibility, whereas the health network was part of the Imperial Organization for Social Services, a nongovernmental charitable organization. Both the project and the health network were ultimately responsible to the same man, a special senior advisor to both the Prime Minister and the Imperial Organization for Social Services, but this separation in the field proved to be a source of numerous problems, including poor coordination, which reduced the effectiveness both of the project and of the health network.

Local Involvement

Before attempting to assess the achievements and problems of this experiment, it would be interesting to describe the salient features of the approach used in Lorestan. The project is being carried out in a part of the Selseleh district, north of Khorramabad, with a population of between 35 000 and 40 000 semi-nomads. The basic premises of the project were that through the training of local cadres, participation, research, and a type of *endogenous* development process would be set in motion in which the main emphases would be on: (1) *people,* both as the instrument and object of development; (2) *participation,* through which the local population would be involved in cooperative activities and decision-making; (3) *local human and natural resources,* fostering self-reliance designed to eliminate excessive

dependence on outside initiative and resources; (4) *integrated growth and development;* and (5) *orientation toward the majority* of the population who have usually been denied the benefits of progress.

In spite of a number of management and other difficulties at the outset, the training of four groups of frontline workers in health, education, agriculture/animal husbandry, and women's activities was begun between the autumn of 1974 and the summer of 1975. During August 1975, a common training program was carried out for all trainees. By this time the rural education group had completed about 9 months of training, the health workers about 6 months, and the agricultural extension workers 4 months. The women were still being recruited, though most were still in their villages.

Prior to the common training program the health workers had had a 2-month theoretical training program and a 4-month practical training period. The theoretical training program included: general knowledge of human anatomy and physiology; personal and community hygiene; environmental sanitation; history-taking, physical examination, and record-keeping; the health network and the referral system; disease etiology; injections and dressing; first aid and emergency cases; medical statistics; and some aspects of traditional and herbal medicine.

Following this theoretical training, the practical training program included supervised work, mostly in the health centres, with some visits to villages in the area for purposes of observation, practical training, and administering vaccinations. In addition, a 2-hour class was included every afternoon, on the following subjects: family planning; maternal and child care; normal obstetrics; food hygiene; elementary dentistry, including tooth hygiene and tooth extraction; common local diseases; filling out health certificates; preventive medicine and vaccination; medical and social statistics; and elementary sociology. Finally, in addition to the month-long common training program that will be described briefly later, an "internship" program was planned for the behvarzes, mostly to give them extensive clinical training.

Epidemiological Research

Some epidemiological research was done by the behvarzes during their training, with extremely satisfactory results. The work was of publishable quality, and could form a significant basis for planning health services in any area with virtually nonexistent epidemiological or demographic data. This approach would also be useful for evaluating the impact of village workers and primary health care in remote areas.

A second innovation was a habitat management program for malaria control in the area. In spite of nearly two decades of intensive indoor DDT spraying, malaria has not been eradicated in this area and has recently been on the increase. The behvarzes and other frontline workers were involved in simple habitat management activities for anopheline mosquito control.

Another innovation was in the area of recycling and waste management. A pilot methane production plant was set up that converted cow dung — the main fuel in the area — to methane gas and organic slurry. The clean methane gas, or biogas, can supply most fuel needs of rural populations. The heat value of this gas is about two and one-half times greater than that gained from burning dried dung cakes. The slurry is the best organic fertilizer available and returns essential organic material to the soil. In addition, the production of methane helps solve a major public health problem by improving sanitation since human excreta and other organic wastes can also be processed in these plants.

Our pilot biogas plant was located near the common training camp, enabling the health workers and other trainees to become familiar with the processes involved. Further research is needed on the biogas to make its production practical on a community scale, but our experience so far shows that villagers are willing to have community-run cooperative biogas plants that could guarantee everyone's needs, irrespective of the number of cattle they each own.

The most significant differences between the Lorestan and Fars health network were the following: (1) in Lorestan, health care was considered as one component in a total development approach, and (2) health was

A village in Lorestan

considered a basic right of every inhabitant of the region. Thus, the region was divided into 26 subregions, each with a population of about 1000. In the selection of trainees, care was taken to have equitable subregional representation, except by women who were mostly from the town of Alashtar, since there are few schooled women in the rural areas.

Shortcomings

In spite of the significant conceptual differences compared with the Fars experience, many shortcomings also affected the program. Some of these will be examined here.

The lack of administrative coordination has already been mentioned. The problem was very serious and should be avoided at all costs in future projects. It meant that in practice the physicians — and hence the behvarzes — were not necessarily subject to the policies governing the development project: there was an unwritten but de facto mutual nonintervention treaty, and it made it very difficult to put the main emphasis on prevention and other nonclinical prerequisites of health. Even within the health network per se there was a lack of coordination between the main health centre in Alashtar and the supposedly affiliated one in a nearby valley.

The recruitment of the 35 behvarzes was done in much the same fashion as in the Fars program, that is, primarily by means of multiple-choice examinations. Moreover, the announcements for enrollment were sent out to the villages through the office of the district governor, who in turn asked the gend'armes under his control to distribute the leaflets. The fact that recruitment was carried out in the difficult winter months further impeded what little contact there might have otherwise been with the local population. One result was that most of the women admitted had a slightly urban orientation.

The training program was carried out in the town of Alashtar, and consisted mainly of classroom and clinical teaching in the local health centre, which had been taken over by the project-affiliated physicians. Field trips to the villages were included in the program one or two mornings a week, but these generally took the form of hands-in-pockets observation exercises.

In short, the peasant health workers were

well on the way to becoming mini-doctors, complete with white-coated elitist tendencies. The young project physicians themselves did what their training had prepared them to do, by confining themselves to visiting scores of patients every morning in the health centre, sometimes increasing the dependence of the local population on modern drugs and injections, and preparing the frontline health workers to do more of the same. In fact, most observers of the program agree that the behvarzes depend on and use too many modern drugs. The normal array of modern drugs at the disposal of the behvarzes include about 200 medicaments. Some of these include potent and dangerous substances.

Not enough effort was made during the initial training program to teach the behvarzes how to attack the real causes of ill-health — underdevelopment, malnutrition, and poor sanitation. No notice was taken of the vast array of locally available and other herbal medicines, even though the area is very rich in them, and the population's own potential for self-care was neglected.

The common training program was partly intended to change this picture and counter elitism. It was the first time the behvarz trainees were coming into daily contact with their future colleagues in other fields, and also with the rest of the project staff. The program was intensively practically oriented, and included the cooperative construction together with the local population of rural roads, latrines, and clean water sources. It also included cross-disciplinary training.

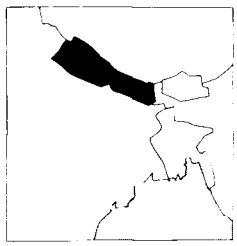
The health workers learned about agriculture, animal husbandry, and literacy work; the rural teacher-trainees learned about public health and agriculture, and so on. The rural agricultural extension workers participated in the teaching of important subjects in their field to the other groups, and vice versa. The project staff, even including some of the physicians, participated in the practical work. All told, it was quite helpful in rounding out some of the rough edges, but not to the extent we had wished.

The behvarzes were the only group that lived in a town: even though Alashtar has only 4000–5000 people, its atmosphere has many urban characteristics. After the common training program, the behvarzes virtually refused to move to the rural areas.

During the last period of their training a new idea was introduced by the project staff: the so-called "three dimensionalization" of the trainees. (The women's group had been dissolved following the most recent staff changes in the project, leaving only three groups.) This meant that instead of each working in his or her own professional field such as agriculture, health, or education, the trainees would become multipurpose agents of development. Without commenting on the merits of this decision — since more exacting evaluations would be needed for that — we can say that the "three dimensionalization" program has not worked in the case of the health workers. This was, no doubt, at least partly due to the elitist and overly professionalized attitudes of the behvarzes and their physician-teachers.

One conclusion that many of us have reached is that the next time we try to train frontline community health workers it will be without heavy reliance on professional physicians. That is, we will give *development* a higher priority as the only proper context for health.

Village health workers have at their disposal an array of drugs



NEPAL

Health Care in Nepal

Population:	12.9 million*
Infant mortality rate:	169 per 1000/yr
Crude birthrate:	45 per 1000/yr
Crude death rate:	23 per 1000/yr
Rate of population growth:	2.3% per yr
Per capita GNP:	$80

**All figures from 1976 World Population Data Sheet of the Population Reference Bureau, Washington, D.C.*

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The Kingdom of Nepal has started developing a health care delivery system on a national scale. A concept of integrated health services has been adopted in a 5-year plan (1975–80), and several pilot projects have been undertaken to study different health delivery systems making use of large numbers of low-level health workers, smaller numbers of middle level workers, and very few medical doctors.

A rapid expansion of health services is envisaged, and the Institute of Medicine, a branch of Tribhuvan University in Kathmandu, has been given the task of studying and developing programs to reach the maximum number of people with the limited financial and technical resources available in the country (there are at present 23 doctors and 27 nurses for every million people).

As a preliminary step, the Institute of Medicine, with the help of a grant from IDRC, has undertaken a research project aimed at identifying as precisely as possible the country's health problems, needs, and the methods required to meet these needs. The goals are:

- to develop a detailed inventory of trained health personnel;
- to study health problems and needs as perceived by the people themselves, to identify methods used by people to meet their own health needs, and to measure the cost of health care;
- to identify the health needs as perceived by professionals, and to survey the role of health institutions.

The results of these surveys are to be used to improve programs and make them function-oriented in regard to health requirements.

The preparation of the survey itself presented considerable problems: questionnaires had to be developed and tested; interviewers recruited and trained; supervisors selected; and the test area mapped before a first survey of 1000 households could be undertaken.

The interviewer's task was not an easy one. Households had to be visited either in the morning or in the evening when the head of the household was likely to be home. The data was gathered in the Tanahu district, a hilly region of central Nepal. Considerable distances had to be covered on foot — some villages were a full 2 days walk apart. After the questionnaires were perfected, a coding system had to be developed for use in the analysis of results. Typical of the problems faced was how to estimate the cost to villagers of health services, when sometimes they would pay with a chicken, sometimes with a goat, but never with money.

The following tables give a sample of the type of detailed information that will be available. The preliminary results were tabulated by hand for presentation at this seminar, pending computer analysis of a larger sampling. Seasonal variations in the occurrence of illnesses should be kept in mind, as these surveys were conducted in winter months.

Table 1. Percentage distribution of expressed health problems for a 14-day recall period and a 1-year recall period for the Tanahu district, 1975.

Types of illnesses	% ill	
	14-day recall	1-year recall
Fever and body pain	24	26
Diarrhea and abdominal conditions	23	20
Respiratory disorders	16	12
Skin disease	8	3
Accident and injury	6	3
Eye disease	6	6
Joint pains	4	7
Paralytic condition; fits and nervous symptoms	3	
Ear disease	2	4
Heart disease	2	
Palpitation		3
Dental trouble		8
Measles		2
Swelling of limbs and body		1
Female disease		1
Others	6	4
	100% (N=392)	100% (N=6852)

Table 1 shows the percentage distribution of health problems over a 14-day recall period and over a 1-year recall period expressed by the sample population of the Tanahu district. Illness with symptoms of fever and body pain affects the largest percentage of the population, followed very closely by abdominal disorders and respiratory illnesses. Other illnesses, such as skin lesions, eye diseases, joint pains, etc., are much less frequent.

During the last year, the three major illnesses affecting the population have been fever and body pain, diarrhea and abdominal conditions, and respiratory disorders, which are the same three major illnesses for the 14-day recall periods. This consistency is one indication that the data is reasonably accurate in depicting the populations's true state of health.

Table 2. Percentage distribution of major expressed health problems by children/adults for 14-day recall periods, Tanahu district, 1975.

Types of illness	% ill			N
	Under 5 yr	5-19 yr	Over 20 yr	
Fever and body pain	28	34	38	96
Diarrhea and abdominal conditions	12	18	70	90
Respiratory disorders	6	20	74	64
Skin disease	19	23	58	31
Accident and injury	0	26	74	23
Eye disease	17	35	48	23

The distribution of major illnesses in three age-groups over the 14-day recall period is shown in Table 2. All the major illnesses occur most frequently in the adult population, less frequently in the 5–19-year age-group, and least of all in the group of children under 5. The same pattern held in the distribution of illness in the 1-year recall period. It is worth noting that the adult group is the largest group, the 5–19-year age-group is next, and the group under 5 is the smallest.

Except for measles, which was not recorded in the 14-day recall period tables, all illnesses have a higher incidence among the two older age-groups (Table 3).

From the analysis of these and other statistics, we have concluded that the order of prevalence of various major illnesses is the same for the 14-day recall period as for the 1-year recall period. This is uniformly true for fever and body pain, diarrhea and abdominal conditions, and respiratory disorders, which constitute 63% of the total illnesses recorded in the population. The remaining 37% of the sicknesses include skin disease, accident and injury, eye disease, joint pains, paralytic disorders including fits and nervous conditions, ear disease, heart disease, and others (Table 1). In the case of the 1-year recall period (Table 1), the three major diseases account for 58% of the total illnesses experienced.

While designing the survey it was decided to limit the recall period for illnesses to 2 weeks, although in such a short period it is difficult to obtain a comprehensive view of

Table 3. Percentage distribution of major expressed health problems (person times) for 1-year recall period, Tanahu district, 1975, by the age-groups under 5 and above 5 years of age.

Types of illnesses	Person times ill (%) Under 5 yr	Over 5 yr	N
Fever and body pain	27	73	1868
Diarrhea and abdominal conditions	33	67	1354
Respiratory disorders	25	75	790
Dental trouble	14	86	559
Joint pains	10	90	448
Eye disease	33	67	421
Ear disease	45	55	259
Palpitation	7	93	225
Skin disease	40	60	219
Accident and injury	25	75	216
Measles	74	26	141

the course of a long illness or to learn how an individual or a family regularly seeks health care. To make up for this, it will be necessary to select a sample of households to be surveyed periodically. Based on data gathered over an extended period of time, we can develop detailed recommendations on the training and services provided by Nepal's health sector of development.

Our next focus is the variety of treatments available to the ill, particularly those people ill of the three major diseases, i.e. fever and body pain, abdominal conditions, or respiratory disorders, and the treatment they choose. The main findings of Table 4 are:

- The group affected by fever and body pain has the largest percentage who seek treatment. This group waits the least time before going for treatment, yet fewer of them go to a modern health facility than do persons affected by other illnesses and a substantial percentage of them resort to spiritual healers and self-treatment. Non-reporting under "Ayurvedic aushadhaly" is understandable because the population does not distinguish between qualified aurbedic personnel

Table 4. Nature and types of treatment (first contact) by various illnesses for 14-day recall period, Tanahu district, 1975.

Illness	% treated	Number of days preceding treatment 0-1 (%)	1-3 (%)	3 (%)	Types of treatment: Modern health facility (%)	Ayurvedic aushadhaly (%)	Unqualified hereditary ayurvedic vaidya (%)	Spiritual healers (%)	Self-treatment (%)	Traditional healers (vaidya) (%)
Abdominal	36	18	32	50	66	-	7	17	10	7
Respiratory	29	14	29	57	76	-	12	4	8	12
Fever	41	22	34	44	46	-	-	30	24	-
Dental trouble	40	-	100	-	50	-	-	50	-	-
Joint pain	38	-	60	40	33	-	17	33	17	17
Eye trouble	52	36	28	36	47	-	6	-	47	6
Ear trouble	37	33	-	67	75	-	-	25	-	-
Palpitation	50	-	100	-	100	-	-	-	-	-
Skin disease	25	20	40	40	14	-	-	86	-	-
Accident and injury	50	50	17	33	42	-	-	16	24	-
Measles	-	-	-	-	-	-	-	-	-	-

Terraced hills and isolated villages in the mountainous region of Nepal

and unqualified hereditary aurbedic vaidyas (physicians).

- In the case of health problems related to abdominal disorders, although a lower percentage of the affected persons (compared to persons with fever and body pain) seek treatment, a higher percentage of those who do, go to a modern health facility and a lower percentage go to spiritual healers or rely on self-treatment.
- In the case of respiratory illnesses (which is the third most prevalent illness) the percentage of persons seeking treatment is lower than for the other two major illnesses. More people with this disease wait more than 3 days before seeking treatment, although when they do, the majority of them go to modern health facilities. The percentage resorting to spiritual healers and self-treatment is the lowest of the three groups.

Health Care in Nepal

A number of "vertical projects" are run by the Ministry of Health, including the malaria eradication organization, the family planning and maternal and child health project, smallpox eradication project, and the TB control project (the last two currently are not active in the district).

The malaria eradication organization appeared to be particularly active, as 68% of the sample households had been visited by malaria field workers during the 1-month period preceding our interviews, and the incidence level of malaria in the district was at 1.1 per 1000 population. Under the smallpox eradication project, 20% of the population had been vaccinated against smallpox and the smallpox incidence in Nepal in 1975 was zero.

Medical training in Nepal

Once the full-scale survey is completed, the health care system will be developed, combining lower level, middle level, and "diploma level" health workers.

Lower level health workers include retired Gurkha medical orderlies who have had 6 months formal training under the supervision of the Institute of Medicine; junior auxiliary health workers (also known as village health workers) who currently receive 3 months of training; village midwives, or traditional birth attendants, who receive 7 days of training.

Middle level health workers are all trained by the Institute of Medicine. The institute offers six regular programs for this paraprofessional group, and a variety of certificates: for health assistant in general medicine; for nurse-midwife in nursing; for assistant ayurved physicians in charge of

Communications and transportation remain two major problems

ayurved dispensaries; for health lab technicians in laboratory work; and for the operators of hospital radiography units, in radiography. An additional 2 years of education leads to the general medicine auxiliary certificate, with which one can work as an auxiliary health worker or as an assistant nurse–midwife.

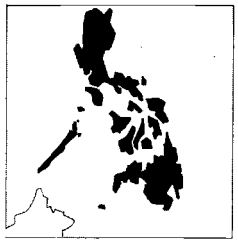
There is no medical faculty in Nepal, but a higher level of training is being planned at the Institute of Medicine to include diploma level courses in nursing, ayurved medical science, and general medicine.

A health care system seen as a circle of concentric rings rather than the customary pyramid with the doctor at the pinnacle, may illuminate not only the team concept with everyone contributing, but also the pattern of manpower needs in Nepal, with the lower level workers required in the largest numbers, the middle level paraprofessional and auxiliary workers in lesser numbers, and the professional group required in smaller numbers.

Primary medical care will be delivered to the villagers mainly by auxiliaries under the supervision of paramedical personnel holding certificates in medical science (general medicine or ayurved) and in charge of a health post, as well as by the paraprofessional in general medicine or ayurved. Secondary medical care will be given mainly by the holder of a diploma in medical science, such as a community or ayurved physician. Holders of medical degrees in the country, including senior medical officers and civilian surgeons, specialists and superspecialists, would be expected to provide tertiary medical care.

Modern and traditional medicine

Until about 200 years ago, the allopathic system of medicine prevailed, but its methods, including bloodletting, the purge, and using leeches, declined in popularity as homeopathic medicine and the use of vaccines increased. Modern medicine in Nepal should recognize whatever is valuable in ayurved and other indigenous practices instead of allowing them to be forgotten. Although developments in general and medical science of the last three centuries have not been applied to ayurved medicine, the system at one time was very advanced. The analytical approach of the great original teachers of ayurved was not maintained and ayurved was unable to remain wholly true to its name's literal meaning — the knowledge and science of life.



PHILIPPINES

Health Care in the Philippines within a Total Framework

Population:	45.9 million*
Infant mortality rate:	78 per 1000/yr
Crude birthrate:	45 per 1000/yr
Crude death rate:	12 per 1000/yr
Rate of population growth:	3.3% per yr
Per capita GNP:	$220

**All figures from 1976 World Population Data Sheet of the Population Reference Bureau, Washington, D.C.*

Victor N. Ordonez

Bancom Institute of Development Technology, Manila, Philippines

Against the backdrop of various programs undertaken in the Philippines to deliver health care to rural areas, an innovative experiment has recently been launched in Licab, Nueva Ecija, a small town of 16 000 people, north of Manila. The aim of this experiment is to have village health workers trained within the context of a comprehensive health care and population education delivery system.

The three agencies spearheading the experiment are the Population Center Foundation, Inc., Bancom Health Care Corporation, and the Bancom Institute of Development Technology, Inc. (Bidtech). Administering the project is the Bancom Institute, a nonprofit subsidiary of the Bancom cluster of companies. Bidtech has been mandated to document the accumulated technology of this group of companies, to train people in the use of this technology, and most importantly, to adapt the technology for rural use. It is the goal of Bidtech to apply the Bancom experience, resources, and contacts in the efficient management of a total human community.

A prime example of the technology transfer function within the Licab community is in the area of health care. A second major institution within the Bancom group, Bancom Health Care Corporation, has played the major role in providing the professional and technical inputs for the health dimension of human settlement management.

While casting about for the initial funding that would enable both Bancare and Bidtech to undertake the design of a comprehensive system to address the health, nutrition, and population needs of Licab, we found one agency with the same interests. This was the Population Center Foundation (PCF), who, although primarily concerned with population education and family planning, quickly recognized that its effectiveness would increase with its ability to include projects within the larger health program, thus avoiding possible public resistance to an isolated family planning effort.

Recognizing the urgency of universally improving the quality of human existence, the PCF embarked on programs using innovative approaches to medical manpower resource problems. These are being undertaken on the assumption that a strong health infrastructure contributes to a successful family planning program. The first approach is the "Community-Based Health and Family Planning Internship Project," which employs innovative schemes of medical and nursing manpower distribution to rural areas without doctors. Within this project, the resources of private agencies and institutions are being tapped to provide the necessary linkages between manpower sources and communities with expressed needs for medical services.

The second project is called *Medikong Bayan* — a "barefoot doctor" type of project that seeks to test the subprofessionalization

of auxiliary health workers, their acceptability to the community, the feasibility of funding the auxiliary health worker through a health maintenance organization scheme, and the viability of the administrative set-up under which the scheme will function. Initially, the project's conceptual model will be tested in 10 municipalities including 100 barrios and will expand later to another 10 municipalities. For each barrio, one auxiliary health worker will be trained to give primary health care and provide treatment in emergency cases.

The Licab project is viewed as an opportunity to provide initial funding that will result in a methodically developed, comprehensive, and replicable system providing population nutrition and health care delivery.

Initial Entry into Licab

Bidtech started its human settlements management experience in Licab in June 1975. At that time, Bidtech was concerned with limiting itself geographically to one community, but not in any other way. It thus sought to address itself to the entire range of human concerns that encompass man's economic, sociopolitical, and cultural needs. Within this context, specific projects were initiated in areas worthy of special attention.

In November 1975 Bidtech secured an initial grant from PCF and formally called upon the professional consulting services of Bancare to design, test, and implement a comprehensive health, nutrition, and population program. It recognized that a major component would be the training of village health workers. Bidtech, Bancare, and PCF saw, however, that a village health training program would be most effective in the context of a total health system design that would in turn be most effective within a comprehensive human settlements management design.

Thus, the primary goals of the project have been to train village health workers within the context of a delivery system that consciously emphasizes the development stage of the delivery system. There is an explicit effort to avoid past shortcomings that included the implementation of a preconceived system that proved unacceptable to the community, inaccessibility of the system, unrealistic resource requirements, overuse of imported and overskilled manpower, lack of growth toward self-sufficiency, and the absence of replicability to other communities. Consequently, the present design for the Licab delivery system adheres to the following guidelines:

(a) The survival of the system is largely dependent on the pertinence and acceptability of programs to the community for which it is designed. Program development will therefore take into account the psychosocial factors present in the community that will have to be systematically identified and analyzed.

(b) The health care delivery systems must be accessible and must therefore provide a continuity of services and be available to the whole community.

(c) The family planning health care system must be realistic both in its magnitude and its resource requirements.

(d) To avoid the use of overskilled manpower for simpler health care, health workers will be trained at a paraprofessional level.

(e) A financial viability scheme should be developed that would lead to self-sufficiency subsequent to the phase-out of the project. Financial independence can be achieved by providing health care to more people and ensuring their financial commitment to it. This would provide enough financing to support the medical professionals and paraprofessionals.

(f) A main goal of this proposal, emanating from these guidelines, is to develop a design sufficiently innovative, and yet replicable, to serve as a model for hundreds of other Philippine municipalities.

Health Workers Training Program

Already, the subcomponents of the health care delivery system are being tested. A health worker training subprogram has been designed that includes elements dealing with health, emergency first aid, treatment of common sicknesses, body functions and systems, maternal and child health, nu-

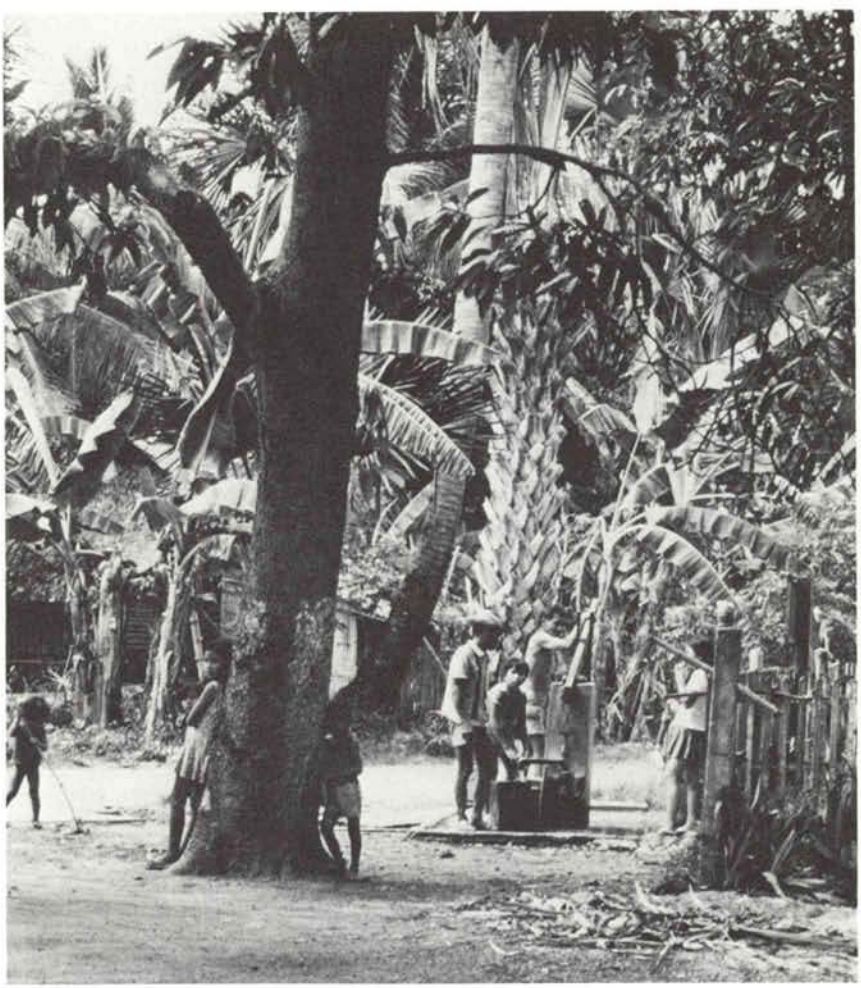
trition, and responsible parenthood. For this village health worker training subprogram, six individuals from the village have been chosen for training and eventual service. These six individuals, four women and two men, all recent high school graduates, manifest a commitment, based on interviews and resumés, to serve their community in the field of health.

Concomitantly, the community is involved in orientation sessions and key factors are being altered, particularly the community's tendency to seek doctors or nurses where paraprofessional health workers would be adequate.

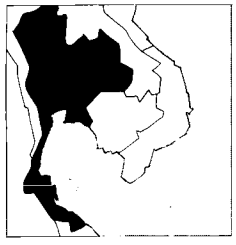
The hope of designing mechanisms leading to a self-supporting health care system is premised on (*a*) encouraging health workers to establish secondary sources of income (backyard agriculture and livestock projects) and (*b*) raising the community's economic level and therefore its ability to afford health services and medicines.

Insights from the Licab Experience

Looked at in isolation, the health workers training program in Licab is similar to several training programs throughout the world. The basic elements of providing indigenous personnel with fundamental knowledge and skills to provide primary health care at a paraprofessional level are strikingly familiar. What distinguishes the Licab training program, however, is the fact that the program is one of several subcomponents in a comprehensive health care system design that is being methodologically developed. A further distinction of the program is its aim to address the totality of the community's needs.



Villagers drawing water in Cebu, Philippines



THAILAND

Auxiliary Health Training and Development of the Faculty of Medicine at Khon Kaen University, Thailand

Population:	42.7 million*
Infant mortality rate:	65 per 1000/yr
Crude birthrate:	43 per 1000/yr
Crude death rate:	10 per 1000/yr
Rate of population growth:	3.1% per yr
Per capita GNP:	$220

**All figures from 1976 World Population Data Sheet of the Population Reference Bureau, Washington, D.C.*

Kawee Tungsubutra

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Thailand's 71 provinces are divided into 8–10 amphurs of 8–12 tambons each, with 8–12 villages in each tambon. In each province in the rural area there is a provincial hospital to handle the curative aspects of health care, and an office of the chief medical officer to handle the preventive and promotive aspects.

At the amphur level, there is a maternity and paediatric centre and a health centre with a resident physician. About half the health centres, which are supposed to have a resident physician, in fact, have none. Ideally, each amphur has a health centre staffed by a physician, but in 565 amphurs, only 252 health centres have MDs practicing in them, and the rest are staffed by nurses.

Tambons have health stations or maternity clinics staffed by health personnel with limited training, such as midwives or other paramedics. At the tambon level, there is a sanitation centre with a public health nurse and one or two junior sanitation workers.

Rural Health Needs

Close to 75% of the population live in about 50 000 villages in which there are no government health officials at all. For their health care, the people in these villages have to rely on old Thai medicine, quacks, or magic. Some pharmaceutical supplies are sold in village shops. The greater the distance of a village from a town, the less its health care system is developed.

We now have four medical schools that train between 350 and 400 doctors a year. The new graduates always choose to practice in the capital or in large towns rather than in rural areas where they feel isolated. Many doctors are concentrated in the 84 provincial hospitals staffed by 12 to 20 physicians each. The result is a very poor distribution of doctors between the urban and rural areas. An additional problem is the loss of competent doctors to developed countries.

We distributed questionnaires about basic health needs to officials in the 16 provinces of the northeastern part of Thailand and we used the analysis of these questionnaires as a guide for developing the curriculum for village health volunteers, and to design our health care delivery system to reach more people.

Analysis of the responses showed that people want, above all, someone nearby to consult when they are ill, with little or no emphasis being placed on that person's level of competence. In reality there is little choice. Even though a villager may want to visit a doctor, it may not be possible because the distance is too great or the cost too high. As a result, the people continue to rely on old Thai medicine, and it will take some time before they will accept a modern health care delivery system.

Three basic problems remain to be solved to overcome the health problem, and it is essential to solve them simultaneously as they are intimately bound in a vicious cycle: poverty, poor education, and poor health.

So far, the government has made no real effort to solve these problems, so we have submitted to the government four proposals that could be the beginning of a solution:

- There should be a consulting hospital in the region to refer patients to, rather than sending them to the city, which is not practical. The provincial medical school should accept this role, and could, in close cooperation with the Ministry of Public Health.
- There should be some mobile units at the medical school to visit every health centre each morning to collect samples to be tested in the medical school laboratories and returned to the health centre on the following morning when the next day's samples are collected.
- The same mobile units would serve as the mobile lending library for medical personnel.
- The government or the Ministry of Public Health should provide better incentives to doctors and nurses who work in rural areas, including assurances of good education for their children.

Close cooperation between the Ministry of Public Health and the faculty of medicine in the region is required to promote a new concept in health care delivery.

Medical and Health Education

Questionnaires were sent to doctors working in each of the 16 provinces of the northeastern region and to provincial leaders. Based on the answers, we have altered the medical curriculum at Khon Kaen University to produce an MD who will serve the requirements of the community, yet retain standards on a par with other medical schools in the country. The duration of medical education is to be kept to 6 years and postgraduate study can be done both in Thailand and abroad.

Medical education has traditionally been divided into three equal parts: 2 years each of premedical, preclinical, and clinical training. In the northeastern provinces where a physician is expected to work alone after graduation in a rural health clinic, the emphasis in the medical curriculum was changed to provide him with a solid clinical background and now includes 1 year premedical, 2 years preclinical, and 3 years clinical training. An internship of 1 year was instituted as in other medical schools.

Unnecessary detailed in-depth study of some subjects (including anatomy) has been eliminated in reducing the premedical period to 1 year. Practical subjects, such as sociology, economics, and psychology, have been added to the curriculum, with special attention given to community medicine. Both the preclinical and clinical curriculum are integrated by giving a lump sum credit. This method will prevent the departments from going into too much detail in subjects irrelevant to medical students training for general practice. In the clinical period, only general medicine, general surgery, obstetrics, gynaecology, and paediatrics will be taught. Subspecialties will be taught concerning only the diseases common to the northeastern region, such as parasitic infestation or tropical diseases, urinary stones, common skin diseases, anemias, malnutrition, etc. Students will be offered a period for the subject they are most interested in, or that might be most useful (such as anaesthesiology or radiology), which they can, in turn, teach their staff when they are assigned to work alone in the health station. History of medicine, as well as medical ethics, are to be included in the curriculum with the aim of inducing a positive attitude in students toward the profession and its members.

Involvement of medical students in villages is encouraged after they have completed the premedical training. In the summer, 1st-year medical students will visit villages near the university. Second-year medical students will gather detailed health data in villages. Students will visit different villages every year and in time the faculty of medicine will acquire detailed health data on villages that may be useful to future health planning. Third-year medical students will be assigned to 5-day stays in remote villages to advise villagers on improving environmental sanitation. We will follow up the progress of village health volunteers trained by the faculty of medicine and the Ministry of Public Health officers, and will see the differences between remote villages and ones near towns. The students will be trained to advise villagers on preventive and promotive aspects of health care when in villages during the community medicine

At Khon Kaen, volunteers are trained as village health workers.

period. This is hoped to increase the villagers' confidence in medical personnel. Students will be trained and allowed to work in the health clinic and the provincial hospital in the last year of the program.

Recruitment of medical students will favour local students. Northeastern students are handicapped in the secondary school by the relative shortage of qualified and experienced teachers and of equipment and laboratories. If they were not given preference and had to compete with better-schooled students from the capital, only a small percentage of the local students would enter the medical school. Consequently, 60% of the places in the medical school have been reserved for local students. The remaining 40% will be filled by students taking a competitive entrance examination and having interviews with psychiatrists and other medical personnel interested in selecting candidates with good attitudes toward rural people. The students have to sign contracts with the Ministry of Public Health to remain in the northeastern region for 4 years after their graduation. Our first group of medical students will graduate in 1978.

Village Health Workers

Since no qualified doctor will put up with the hardships and inconveniences of the remote areas, we have ensured that there will be some trained health personnel in these areas by training some villagers as health volunteers. With the cooperation of the Ministry of Public Health, our medical faculty has set up a 2-week course to train these villagers. The curriculum, the period of training, the basic knowledge of the teachers and the selection of the trainees are carefully discussed; most of the criteria are based on the knowledge gained from the questionnaires and from visits to the villages.

The intention of this pilot project is to test both the feasibility and effectiveness of extension of the health care system to rural populations by training indigenous village health workers. These health workers or volunteers will serve the rural population as part of a health team headed by a medical doctor.

We will evaluate the effectiveness of our village volunteers in a preliminary assess-

ment at the end of 2 years, and in a final evaluation at the end of 5 years by comparing data collected before and after implementation of the system.

We expect the village health workers to have the following capabilities:

- to understand modes of infestation of common parasitic diseases including malaria, liver flukes, hookworm, roundworm, and tapeworm;
- to teach villagers to protect themselves from these diseases;
- to treat malaria patients;
- to understand and use the referral network for cases beyond their capabilities;
- to treat simple diarrhea, the common cold, tonsillitis, and to make a simple dressing;
- to give first aid treatment and use life-saving procedures;
- to do a normal delivery of a baby without a midwife and to give family planning advice;
- to understand simple nutrition and infant feeding;
- to give advice to villagers about scabies, lice, and fungus infections of the skin.

We do not expect villagers to learn all these skills in 2 weeks but to assimilate as much as they can. We will assist them in the villages every month and either teach them in the villages or recall them every 6 months to study, or both. We expect our students to have mastered all the required skills within 2 years.

These villagers will serve their neighbours as unpaid volunteers at almost no cost to the government. The volunteers will continue to earn their living as farmers while serving as the basic health personnel in a health network.

Our training course for village health volunteers started in early February 1975 with the cooperation of the Ministry of Public Health who lent us their facilities. There is one teacher for the in-service training of each five students. The second course was finished on 24 January 1976.

Follow up and revision

We will avoid too close supervision of the village health workers because it would not help their training, and would be impossible. However, we will assess them frequently to prevent their doing more harm than good. This can be done by arranging a program of health education and disease treatment in the villages at regular intervals. The supervisor, the volunteer health worker, and doctors from nearby health stations will participate and get to know each other. The basic health worker will learn not to endanger a patient's life by his own ignorance, and to refer the patients who are beyond his capabilities to the tambon health centre. During the program, an evaluation of the basic health worker's progress can be gained from first-hand observation.

A VHW training group

Our supervision system will involve team rather than individual supervision. The health officer who works at the second level health station situated in the tambon nearest the village is most closely associated with the VHW. If we arrange to have the group process operate in the village at regular intervals, other medical personnel including the doctors at the nearby first level health station, and staff physicians in the community medicine program of the medical faculty, can participate in the supervision program. The chief doctor in the province,

Midwifery clinic in rural Thailand

with the cooperation of the medical faculty, has arranged a course for the health officers in selected second level health stations to gain the competence to supervise the VHW. In the team supervision we have different levels of supervisors; only the lowest level of supervisors will be closely associated with the VHW; their area of responsibility is close to the VHW's, and they are receiving formal training by Ministry of Public Health personnel and by us.

Evaluation of the VHW

Individual VHWs will be evaluated every year by the analysis of questionnaires sent to the people in the area where they are working. This will be supplemented by a personal visit of the staff of community medicine of this project, and information from all levels of our team supervision.

We have planned to have an institute of community medicine and population sciences to take over the job when this project is finished. The objective of this institute will be the continuation of this project if it proves to be effective and useful. Once we have the hospital of the Faculty of Medicine, in-service training can easily be arranged. Along similar lines, supervision of health workers by the existing medical system after the termination of this project, will be done by the Institute of Community Medicine and Population Sciences, with the cooperation of the chief medical officer of the provinces in acting as the representative of the Ministry of Public Health.

The project is applicable in the light of the cost of essential back-up services (supervision, regular enrichment courses, etc.) because the cost is reasonable and even a poor country such as ours can afford it. In the next 5 years when IDRC funding is completed, our Faculty of Medicine hospital will be functioning and the Institute of Community Medicine and Population Sciences established: in-service training and any course can then be arranged and given quite easily and cheaply.

PAPUA NEW GUINEA

Providing Health Services for Rural Populations in Papua New Guinea

Population:	2.8 million*
Infant mortality rate:	159 per 1000/yr
Crude birthrate:	42 per 1000/yr
Crude death rate:	18 per 1000/yr
Rate of population growth:	2.6% per yr
Per capita GNP:	$290

**All figures from 1976 World Population Data Sheet of the Population Reference Bureau, Washington, D.C.*

Goasa G. Damena

Department of Public Health, Port Moresby, Papua New Guinea

The growth of health services in Papua New Guinea has been an integral part of the history and development of the country. Prior to World War I, Papua and New Guinea were administered separately under separate health ordinances and it was not until after World War II with a combined Papua New Guinea that there was any real development in health services.

During the early period of administration, health services were limited in both distribution and effectiveness, although attempts were made to provide medical care to village people through patrols. The European assistants on these patrols were soon to be replaced by local medical orderlies and by 1920, these orderlies were already operating in several areas. By 1930, these assistants were making independent patrols and making reports in English, Motu, and Pidgin English. Between 1933 and 1936, three groups of indigenous medical assistants were trained in Papua and New Guinea and at the School of Public Health and Tropical Medicine in Sydney, Australia.

World War II destroyed most of the health services of the country and expatriate medical assistants were recruited to restore them.

It was the policy at this time to replace medical orderlies with more substantially trained aid post orderlies. The training of these orderlies who are "barefoot doctors" in a real sense was a major step forward in meeting the need for health care in rural areas.

Papua New Guinea is a less developed country and the majority of the population (85–90%) live in villages, hamlets, and rural areas. There is a national network of government and church hospitals, health centres, and health subcentres. For many people, access to these institutions is difficult because of rough terrain and poor communications. Since 1946, the Department of Public Health has emphasized the need to provide some health care for everyone, and to this end, the aid post system was established.

Aid Post System

The aid post orderly is the only health worker in Papua New Guinea who lives and works in the villages. The health objectives of an aid post orderly include:

- the diagnosis and treatment of common illnesses;
- the recognition and first aid of conditions requiring referral to health centres;
- the early reporting of outbreaks of disease;
- the provision of local knowledge and support for disease-control programs (e.g., field maternal-child health services, national programs for the control of malaria, tuberculosis, and leprosy); and
- the improvement of personal and community hygiene.

The original target of having one aid post per thousand population (with geographical variations) has been superseded by one

requiring that no person be more than 4 hours from an aid post, health centre, or hospital. Information being collected now on accessibility of health care will provide an objective basis for the achievement of this realistic target through the training of more aid post orderlies and rationalization of the existing network of aid posts. It is quite likely that this time target will eventually be reduced to 2 hours.

Aid post orderlies can give injections of procaine, penicillin, and prescribe sulfadimidine and antimalarial tablets (chloroquine and infant camoquin). Therefore, they can effectively treat pneumonia and bronchitis, malaria, dysentery, and other common infections. Their therapeutic armamentarium includes benzyl benzoate, antiseptics, aspirin, cough mixtures, and so on. Aid post orderlies can suture small lacerations and open superficial abscesses. They know how to treat gonorrhea and syphilis. With the drugs at their disposal, they can reduce morbidity and mortality from a number of common and potentially serious diseases. Failure to respond quickly to treatment is an indication for referral to the nearest health centre or hospital. Aid post orderlies are taught to recognize and provide first aid care to patients requiring more skilled medical and nursing care for acute abdominal disorders, fractures, meningitis, complicated maternity cases, and so on. With assistance from the patients' friends and relatives, the aid post orderly organizes the transfer of these patients.

Many aid post orderlies have little or no formal education. In the early years of the scheme, illiterate young men learned to read and write Pidgin English (a *lingua franca* of Papua New Guinea) before embarking on their medical studies. Now, 6 years of primary schooling is the usual educational entry level with instruction in English, but this requirement is not applied rigidly and teaching in Pidgin English ensures a supply of aid post orderlies for the very remote areas where there are no schools. The overriding aim is to provide health care for everyone.

The Department of Public Health sets minimum standards for the training of aid post orderlies, conducts final examinations, and issues certificates. Initially, there were a number of regional training institutions where training was conducted. Four years ago, the government decided to have one national aid post orderly training school. This year, five regional training schools have been reopened.

The churches receive a government subsidy for training the village health workers. The church program is usually for 3 years, whereas the government course is 1 year followed by a year of supervised experience at a rural health centre. The basis of the training method is practical experience rather than lectures and reading. Students at the regional training centre for aid post orderlies are attached to nearby aid posts and outpatient departments of large hospitals. Selection is locally based, involving councils and provincial health officers. Councils are required to contribute to the cost of training aid post orderlies for their areas. The admission of students to the government training institutions is determined by the need for aid posts and staff rather than the ability of the councils to contribute to the cost of training.

Aid post orderlies are employed by the local government councils, church health services, and the Department of Public Health. The trend is for councils to employ and control aid post orderlies with the government meeting 85% of salaries, raising a small charge for drugs and dressings, and providing the professional supervision and in-service education required to maintain standards. A government subsidy is also paid for church-employed aid post orderlies. Housing for aid post orderlies, aid post buildings, and garden land has always been a community council responsibility with some government assistance. Many aid posts are constructed of bush materials and have small "wards" for short-term patients. Families provide food for these inpatients. Medical care is free though councils may introduce fees to recover costs.

Problems and Constraints

(1) The original concept of health workers working part-time and participating fully in all aspects of village life is giving way to full-time employment with involvement in all health services. Aid posts are frequently assessed and classified according to their work loads.

With improved conditions of service and set working hours, aid post orderlies can be required to work in disease control programs for rural areas and be multidisciplinary health workers. Part-time employment (2–4 hours a day) limited the effective utilization of aid post orderlies too much.

(2) Aid post orderlies are casual employees. As yet, they cannot join the local government service. Apart from a reclassification according to work loads, there are few opportunities for their advancement, with consequent dissatisfaction and low morale. Hopefully, the solution lies with their admission to the local government service that offers employment security, pension and entitlements, and a career structure related to efficiency and seniority. Acquiring "specialist" roles in disease control programs through additional training could open other avenues to advancement.

(3) Orderlies for hospitals and health centres receive on-the-job training supplemented by local in-service education programs, but do not obtain any recognized qualification. These hospital orderlies enjoy better conditions of service than aid post orderlies. Many are permanent public servants with job security, pension entitlement, higher salaries, more opportunities for advancement, and the advantages of living in town, including better housing. Aid post orderlies work alone while hospital orderlies are directed and supported by paramedical and nursing personnel. The disparity between service conditions for these two categories of orderlies assumes greater importance when hospital orderlies are transferred to aid posts while in the early days of the aid post system, the salaries of aid post orderlies were higher. There is a need for parity between these two groups with just recognition for the responsibility taken by aid post orderlies and their importance to the health of rural people.

(4) The most important factor in maintaining and improving the efficiency and effectiveness of the aid post system is the quality and amount of supervision and assistance given by supporting hospitals and health centres. Aid posts need to be visited at least twice each year with the supervising officer staying long enough to learn of problems, give help, provide on-the-job teaching, check on health problems of the area, and strengthen relations between the aid post orderly, the people served, and the local government council. An annual 1-week refresher course is important to orderlies as well as half-day courses held at the aid post or hospital when aid post orderlies come monthly to collect wages and/or medical supplies. The doctor, health extension officer, or nurse responsible for aid posts needs to be freely available for discussions with individual aid post orderlies personal and health problems. Deficiencies in supervision are the main constraint to the smooth running of the aid post system.

(5) The aid post system requires review continuously as the need for posts can be reduced by improved communication. Relocation then provides service to more isolated villages. Economic and social development may lead to people seeking higher standards of medical care bypassing aid posts to go to the nearest hospital or health centres. When patient loads decline, aid posts may need to be relocated, the standard of service upgraded, or the work of the aid post orderly redefined to include a greater involvement in disease control programs or health education. Reviews of the aid post system tend to lag behind area development, which makes some aid posts redundant.

(6) Aid post orderlies collect medical supplies regularly from their supporting health centres and hospitals. There is no national shortage of essential medical supplies but sometimes there are difficulties in maintaining adequate levels of drugs and dressings at aid posts. However, the problem is usually administrative with either a health centre failing to requisition enough drugs and dressings to meet its own requirements as well as those of the aid posts it services, or an aid post orderly underestimating his own needs. The intro-

duction of an imprest supply system should overcome this problem.

(7) Tripartite employment arrangements cause some difficulties. In some areas aid post orderlies may be employed by the Department of Public Health, a church, and the local government council — a situation that does not encourage the development of team spirit. The aid post may instead become a local government responsibility with financial assistance from the central government. Professional supervision, in-service education, basic training, and the provision of medical supplies would then be provided by the Department of Public Health.

(8) In the early years of development of the aid post system, the responsibilities of villages for their aid post were defined as:

- the provision of land for the aid post, and the house and garden for the aid post orderly;
- the construction of a bush material house and aid post, and assisting the aid post orderly to establish his garden;
- the transport of referred patients to the nearest health centre or hospital; and
- the carrying of medical supplies as required.

Times have changed. Buildings have become the responsibility of local government councils. More and more the people are demanding payment for any services rendered. The aid post orderly often has to pay for the trip to the hospital or health centre to report and collect his wages and the medical supplies, or for food and accommodation when he patrols his area. Apart from his salary, the aid post orderly receives no additional remuneration to cover these expenses though the Department of Public Health assists with fares and costs of transporting patients. Many aid post orderlies have to combat not only medical isolation but also the apathy and inertia of the people they serve.

Papua New Guinea is a less developed country with limited skilled medical, paramedical, and nursing manpower. For economic reasons as well, the aid post system is the only feasible way of providing effective medical care for the majority of people living in rural areas. There is a continuing demand from the people, councillors, and politicians for more aid posts. The Department of Public Health is striving to improve the efficiency of the aid post system and to integrate the services provided more closely with the needs and demands of villagers. Improvements continue to be made on the basic training program, conditions of service, supervision and in-service education, accessibility of medical care to villagers, and local control of aid posts.

For aid post orderlies to be as beneficial as possible, they must be recognized as an important member of the health team of an area, and work closely with health centre staff and other health personnel involved in field disease control and health education programs. There is a need for an objective national evaluation of the aid post system.

Beyond the Aid Post System

Assuming the provision of medical care within 4 hours travel for 90% of the population, there will still be many thousands of people living farther away from medical care. Some people may hesitate to set out on a 4-hour journey to the nearest aid post, and the delay could aggravate the illness or injury. The treatment of pneumonia and other conditions requires daily visits to the aid posts or an absence from the village of 3–5 days and disruption of family and community activities, which may cause patients to return home before their treatment is completed.

For many years now, some churches have trained pastors and school teachers in first aid and basic medical care. These church personnel provide health services for villagers among whom they live and work. Could this scheme be extended by training one person for health work from every village where there is no aid post? Important considerations in such a scheme include:

- selection of the person by the villagers themselves (possible utilization of traditional healers);
- therapeutic effectiveness should be guaranteed by a supply of sulfadimidine and antimalarial tablets;
- accurate definition of the duties of these village health workers should be given, along with short job-related training pro-

grams using appropriate educational methods;
- decisions need be made on payment for work performed;
- productive relationships between aid post orderlies and other health personnel should be encouraged; and
- proper supervision and annual 2-3 day refresher courses should be provided.

One suggestion is for these village health workers to collect demographic data. Apart from simple therapeutic care they could notify the aid posts of outbreaks of disease, and assist aid post orderlies and other personnel visiting their villages. Certainly responsibility for village health workers should rest with the community served or local government councils. A village health post would be the beginning of a referral chain — aid post–health centre–hospital — depending on the level of medical care required by patients. To be as effective as possible and to maintain morale and standards of medical care, village health workers should become full members of a health team. The Department of Public Health is investigating the possibility of introducing this scheme in the rural areas of Papua New Guinea.

Many people come to aid posts, health centres, and hospitals with minor conditions that could be treated at home. Demanding care, even from the base of the skill pyramid, may reduce standards of care available for more seriously ill patients and the time available for the prevention of disease and health education. People also lose more time from work by seeking treatment from a health institution than in looking after minor injuries and illnesses themselves. The direct and indirect costs of care for these patients are high because of their numbers.

In Papua New Guinea, there is a need to encourage self-care of minor conditions through public health education (particularly amongst school children) and to ensure the ready availability of selected appropriately labelled drugs and dressings at cost or less. People require drugs and dressings for abrasions and lacerations, headaches, scabies, head lice, the suppression and early treatment of malaria, cough, and so on. Self-care ensures the prompt, cheap, and effective treatment of minor ailments and reduces the patient load on the limited available health resources and facilities. The promotion of home- or self-care is another possible activity of the Department of Public Health.

The Mandate

The eight point improvement program of the National Coalition Government requires improved health services for rural areas and a more even spread of social and economic development over the country. Recently, the Department of Public Health restated its policy as being "... the development, distribution and management of all health resources for health care and improvement programmes so that the greatest benefit for the greatest number of people is derived from these resources." In other words, the aim of the Department of Public Health remains the best possible health care for everyone.

National Objectives for the Aid Post System

- To provide an aid post system so that 90% of the population live less than 4 hours travel from an aid post (or health centre or hospital);
- To visit each aid post at least twice each year (one visit to be by a health extension officer or health worker with equivalent qualifications); the supervising officer to stay overnight. Now district health officers are required to visit annually 10% of the aid posts in their areas;
- To conduct a 5-day annual in-service training program for each aid post orderly;
- To review annually the aid post system with the local government council, and to discuss quarterly the organization and management of the aid post system with local government councils;
- To set aside at least half a day when aid post orderlies come to collect their wages and medical supplies for in-service training and to discuss personal and health problems;
- To report annually on each aid post orderly in terms of professional knowledge and skills, attitude to work, attributes for promotion, general acceptance, and other characteristics;
- To implement an imprest supply system for health centres and aid posts.

The achievement of these objectives rests with district health officers, supervisory staff at district centres, and church and government health workers at health centres and hospitals.

Summary of Discussions

Alexandre Dorozynski

"What kind of health care should be delivered to people who have none?" may appear to be a simple question.

To those accustomed to Western-style medicine, the answer may seem evident: medical care, provided by a sufficient number of physicians readily accessible to the people.

"We have a fixed idea of the association between health and physicians," notes Dr. Hossain Ronaghy. "We speak of so many doctors for so many people, and the desirable ratio of physicians to population keeps growing, because we believe that more doctors means better health. This is not necessarily true. For example, during World War II, about half of the doctors in the United States were drafted into the army. Clear-cut statistics show that there was no change whatever in mortality rates in the country."

In fact, according to Dr. Ronaghy, sending a physician to a village may be a dangerous thing to do: he is a misfit. The medical profession is organized to deliver a certain type of health care, and a medical doctor does not fit into the type of developmental situation that exists in an isolated rural area.

This view was shared by several participants at the seminar. Indonesia's Dr Kartini Binol observed that not only medical doctors, but hospital-trained nurses also, are not prepared for effective work in rural areas.

Training, adds Dr Kawee Tungsubutra of Thailand, must be geared to a "behavioural objective" specifically designed to answer certain needs. And these needs are not self-evident. Is it to reduce infant mortality? To improve sanitation? To cure certain types of diseases? To reduce the birthrate? To make people happy?

These needs must be determined not only in relation to "demand" but to the limitations of what can be offered. Politicians and medical professors may think in terms of modern hospitals, whereas people in the villages may be concerned (as they were shown to be during a survey carried out in Thailand) firstly with what they will eat tomorrow, then with better jobs and working conditions for their children, or, as Dr Ronaghy remarked "with having a mosque, so they will at least build up something for the next world." He adds: "In practice health measures to be taken must be a combination of their demand, of what we feel should be done, and what we can afford to do."

Primary Health Care

When no health services are available, the first step regarding health is to provide "primary health care," which Dr Ronaghy defines as "the first contact between someone who needs health services and someone who delivers them. Not everybody needs health care. Roughly, one could say that 70% of the people need none, that 24% need some ambulatory care, that 1% require extended care, and 0.1% extensive care. In Chicago, 90% of health care expenditures may go toward extended or extensive care of people from one year before their death to their death." This is not justified in developing countries, where "primary health care by a specialist is a waste of time and money."

But the fact that health care in rural areas is not delivered by medical doctors does not mean that there is a double standard between town and village. "Many people in rural areas want a doctor or a hospital because we, the professionals, have injected this need," he says. Care provided by village health workers, in the Kavar project for instance, may in fact be better health care: it starts at home and, through the referral system, can extend to the most modern hospital in Shiraz, via the village worker, the intermediate level health worker, and the health centre physician. The process is rapid (sometimes more rapid than in cities) and it does not tie up physicians needlessly.

It can be effective, because health workers must and can feel responsible for their community, whereas the responsibility of physicians is limited to those who come to see him (the patient, in fact, refers himself to a physician and more often than not he is less qualified than a trained health worker to do so).

"In town," points out Dr Ronaghy, "there is no preventive care. No one comes to my door to ask me if I'm vaccinated, to give me advice, to see whether my child is well and clean. Care available in the village is superior because it is preventive and promotive as well as curative."

Health workers, properly trained toward a well-defined objective, are better integrated into the total development process than medical doctors, who come from another world, and who may feel superior and tend to act as bosses. M. Taghi Farvar of Teheran points out that even village health workers, if not trained carefully, not only with regard to their medical knowledge but also their attitude, "tend to imitate their models and become mini-doctors, complete with white-coated elitist tendencies."

Training should avoid this pitfall. The key word, he says, is participation. An example of such participation was provided during an experiment in Iran's Lorestan province, where the brief presence of an epidemiologist was taken advantage of to make up a simple questionnaire, in collaboration with health workers, to assess health conditions in the area. Each health worker was then asked to survey 10 families during the holidays, so that in a short time, a survey of 350 families was completed with enthusiasm, and data of excellent quality was provided because the health workers felt, and were, involved in the entire process.

"Such involvement," noted Dr Ronaghy, "is difficult if a 'supervising' physician starts acting as a boss, which he is often tempted to do. We make every effort to avoid 'inspection'; we ask doctors not to criticize health workers, particularly in front of patients. We try, rather, to promote a two-way exchange. To achieve this, strong motivation is required, not only on the part of the village health worker, but of medical doctors involved in a project."

For the same reasons, Dr Goasa Damena, who points out that training village health workers in Papua New Guinea started some 30 years ago, says that the words "auxiliary" or "assistant," with their subservient connotation, should be avoided in favour of such terms as health extension officers, aid post orderlies, or allied health workers.

The Power of Cities

The idea of "dependency" is in itself an obstacle to community development, noted Dr Majid Rahnema, of Iran's Imperial Organization for Social Services: "The sad reality of the world's power structure is that cities are oriented toward power. Cities *have* to be modernized. If top level decisions are made for modernization, we are in a bad position, for modernization may go against development, as medicine and hospitals may go against development. If a country really chooses development, and not only modernization, modernization becomes just another one of the problems, not the goal."

The idea of dependency, he feels, is part of the structure of the medical profession. The professionals take it for granted that they should "supervise" health workers. This may exceed their competence, as the kind of relationship they should have with health workers has not been included in the objectives of their training. Supervision may be necessary, but one must determine carefully what kind of supervision.

"We seem to mistrust man's potential," adds Dr M. Mahluji of Shiraz, "but the best we can do is act as catalysts for people themselves to bring about changes, in their own way, in their own culture. The assumption that we must transfer city life into the countryside is far from ideal. Is it really what we are trying to develop? A city man? We need a philosophy to know what kind of society we want. We may not want Chicago."

Not surprisingly, the same gap is perceived in other countries. "We have left the villages as they were 2000 years ago," says Dr Moin Shah of Nepal. "And we view tribal or village people from our own city viewpoint."

An attempt, he says, is being made in Nepal to alter this dominant relationship of the city over the rural areas. "It is the back-to-the-village campaign, initiated several years ago under King Mahendra and further implemented recently under King Birendra, who has modified the constitution to give villages more political power by enabling village councils to send representatives to district councils and to be represented strongly in the national council. At the same time, an attempt is being made to find out

what rural people want, not only what we think they need."

In spite of a lack of medical facilities, frequently of a good water supply, of education, or of adequate food, are the rural people really less healthy than the pampered, overmedicated people in large modern cities?

"I doubt it," says Dr Ronaghy. "City people need sickness care. Rural people need health care. The medical profession is not prepared to deliver it."

Iran, a wealthy developing country, has started hiring thousands of physicians from the Philippines and other developing countries to work on contract in rural areas. "But they will not remain there long," says Dr Ronaghy. "By the time they will have learned the language well enough really to communicate, they will have made enough money to start preparing for the next leap: to the United States. With 10 times less money, we could develop a health care delivery system adapted to our needs — and permanent. But it has proven difficult for developing nations not to adopt the standards of rich nations."

"We in the developing nations," adds Dr Goasa Damena, "are in the best position to learn from the errors of the developed nations. We must make every endeavour to ensure that some health care is brought to the people and I think that we, in the developing world, are beginning to take steps, on our own, and in the right direction, by working from the bottom up."

Traditional Healers

At one time or another, nearly all of the participants mentioned the existence of traditional healers, who are viewed sometimes as obstacles to "modern" health care delivery, but whose authority and experience can also be put to use.

"There is a rivalry between practitioners of old Thai medicine and modern doctors, and even village health workers," says Dr Kawee Tungsubutra. "We have tried to integrate some of them into the system, or at least to avoid competition. It should be possible also to take advantage of their knowledge, and to integrate it with ours."

The now classical example, of course, is that of China, and it required a revolution. Elsewhere, the medical establishment remains the major obstacle.

"If I tried this, I'd be thrown out of medical societies," says Dr Ronaghy, who remembers that his father, and himself when he was a child, were more than once treated very effectively by traditional Persian doctors who have inherited some of the knowledge which, at the time of Persian physician Avicenna, dominated the world.

In Papua New Guinea, likewise, traditional healers have long played an important role, and Dr Damena remembers his hesitations when, as a young medical student, he returned to his village during holidays: "I was sick — a serious gastric problem — but I hadn't taken any medicine along. I was treated — and cured — with herbal preparations. I remember that my father, the village chief, did other things, too; he was pretty good at bone setting."

A partial survey of traditional healers was undertaken in Papua New Guinea with the thought of integrating them into the village health workers teaching system — but the realization of the project was considered too costly.

In the Philippines, points out Dr Victor Ordonez, many villagers still rely on "herbolarios" (who use herbal medicine, prayers, and rituals) and "hilots" (traditional midwives). Both are potential members of a health care delivery team.

In Nepal, says Dr Moin Shah, there may be as many as 12 000 practitioners of ayurvedic medicine, which traces its origins to the second millenium B.C. and to the Susruta Sambita, a medical treatise that is also one of the most important texts of Sanscrit literature. Susruta described 121 surgical instruments, was the first to use a magnet for extraction of metallic particles, and pioneered anaesthesia (with *Cannabis indica*) and reconstructive surgery.

Ayurvedic medicine, although its use has declined, is still widespread in rural Nepal, and the possibility of at least partial integration with modern medicine is being studied. The government has compiled a herbal museum and operates herbal farms for medicinal use.

Medical Education

Another subject recurred during the discussions: medical education. The now "classical" curriculum is so well established and protected that it is not easily challenged.

Dr Kawee Tungsubutra, who has described the new curriculum planned for the Khon Kaen School of Medicine that places the emphasis on practical and field work, agreed that the program could be taught in 5 rather than in 6 years. "But when I proposed to reduce the length of medical studies, everybody laughed and looked down at me for threatening the standards of the profession."

Nevertheless, his approach represents a significant departure from the Western norm and should contribute to limiting the medical exodus to wealthier countries — a "brain drain" that represents a huge expenditure by developing countries to provide the U.S., France, Germany, Canada, England, and other developed countries with additional physicians.

An even more radical approach has been attempted in Iran with the creation of a Bachelor of Science-level health sciences school in Teheran providing 3 years of training to prepare health workers who, from the 1st year onward, acquire civil service status and cumulate seniority as long as they practice in rural areas, but lose the seniority (and the benefits) if they choose to continue their studies to reach the exportable medical doctorate level.

More radical still is the approach planned by Dr Ronaghy, who will be the dean of a new medical faculty in Fasa, in eastern Iran:

"The curriculum will be 6 years, as required by the medical monopoly. But it will consist of 3 years of studies. The other 3 years will be spent in the field — and only then will the students graduate."

It will be a functional curriculum, with the objective of answering the needs of rural areas, not of large cities and modern hospitals. "Some of our colleagues have called the program subversive — but I think it will go through," says Dr Ronaghy.

The week-long meeting was highlighted by an audience of the participants by Iran's Prime Minister, Amir Abbass Hoveyda. "Three years ago," the Prime Minister told Dr Ronaghy, "your idea of health auxiliaries was considered as nonsense. Now it's talked about seriously."

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